

LIPOPROTEIN CHANGES IN HIGH RISK PREGNANCIES AND THEIR PUEPERIUM

THESIS FOR DOCTOR OF MEDICINE (INTERNAL MEDICINE)



**BUNDELKHAND UNIVERSITY
JHANSI (U.P.)**



1998

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CERTIFICATE

This is to certify that the work entitled "LIPOPROTEIN CHANGES IN HIGH RISK PREGNANCIES AND THEIR Puerperium" has been carried out by Dr. RAKESH KUMAR SRIVASTAVA in the Department of Medicine, M.L.B Medical College Jhansi.

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This is to certify that the work entitled "LIPOPROTEIN CHANGES IN HIGH RISK PREGNANCIES AND THEIR Puerperium" which is being submitted as a thesis for M.D (Medicine) Examination, 1998, Bundelkhand University, has been carried out by Dr. RAKESH KUMAR SRIVASTAVA Under my direct supervision and guidance. The techniques embodied in this thesis were undertaken by the candidate himself and the observations recorded were checked and verified by me from time to time.

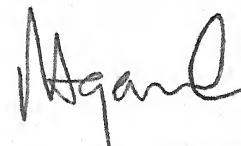
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{Rakesh Kumar Srivastava}



INTRODUCTION

INTRODUCTION

Various studies have been done about the hormonal changes brought about by pregnancy but still pregnancy is a metabolic curiosity. However it brings significant changes in metabolic process. It is known that high concentration of many of the sex steroids occur as normal pregnancy advances and since cholesterol is the precursor of most of these steroids, part played by lipid metabolism in pregnancy becomes more and more intriguing.

It has been observed that increase in serum total cholesterol and serum triglycerides occur steadily till term and then falls abruptly after delivery (Boyd, 1934; Dieckmann & Wegner, 1934; Waston 1957). This was also corroborated by studies previously done in our department (Arora and Indu, 1985, Arora and Vinita, 1986). This denotes that placenta is the principal organ responsible for the elevated serum total cholesterol (STC) and serum Triglyceride (STG) during pregnancy. The incidence of atherosclerosis is less in Indian women even in repeated pregnancies, where the cholesterol level is elevated. This is probably because the elevated Oestrogen might be preventing the deposition of cholesterol in the intima of arteries and veins (Chaturvedi et al, 1978). These metabolic changes are rather exaggerated in Toxaemia of pregnancy (a syndrome complex characterised by hypertension to the extent of 140 mm hg or more with oedema or proteinuria or both induced by pregnancy usually after 20th week of gestation). The toxæmia of pregnancy is an inadequate term which still frequently used to cover a condition peculiar to pregnancy whose aetiology is unknown but was formerly attributed to the action of a hypothetical toxin since it is no longer believed that this disorder is caused by toxin, a better term in pre-eclampsia and is accompanied by fetal and maternal hypercholesterolaemia (Indu Bala, 1983, Lall and Sinha, 1983). Ghosh reported that the value of total cholesterol rises significantly in pre-eclamptic patients. Brat Vold and De Averez (1961) noted some increase in serum total cholesterol in pre-eclampsia as compared with values in normal pregnancy. The difference however was not thought to be significant. On the contrary Arsoba and Kretowicz (1963) reported that such difference was statistically significant. The serum cholesterol level falls gradually in the post partum period both in toxæmia and in normal pregnancy. However in toxæmia cases such levels do not return to normal as quickly as it does in the cases of normal pregnancy. (Lall and Sinha).

Cholesterol is necessary for cell division so it is important for synthesis of structural component of foetus and elevation of all lipid plasma carrier during pregnancy correlates well with the increase in

the fetal caloric demand . Triglycerides and fatty acids are directly transported from the mother to foetus in early pregnancy but probably are synthesized in foetus later in pregnancy . cholesterol is capable of direct transfer from mother to the foetus. Placental production of progesteron can be estimated which is important for maintenance of pregnancy and also as the pre cursor for placental progesterone biosynthesis is maternal low density lipoprotein (LDL) cholesterol (Simpson & associates ; 1954 , Hellig & associates 1970 ; Casey , 1992) so by estimating maternal LDL .

The implantation of the conceptus , the support of embryoic development and continuation of prgnancy depends on a complex interaction and hormonal effects on hypothalemic , pituary uterine ovarian axis . Among the sex hormones important are oestrogen , progesteron , human placental lactogen and human chronic Gonadotrophin . During normal pregnancy plasma progesterone increases to about 25 ngm/ml 9 weeks after ovulation and remain relatively constant until about 10 weeks of gestation when placental secretions taken over . Plasma level of progesteron rises rapidly from 28th week onwards and reaches to approximately 180 nmg/ml with the level being relatively constant during the last 4-6 weeks of gestation . Similarly oestrogen concentration also increases till term (Kloppler and Billiwicz , 1963 ; Beisher et al , 1969) urinary oestrial level also rises progressively during pregnancy from 5.5 g mg / 24 hr at 20 weecxdsew3k to about 33 mg / 24 hrs at term and if the level is less than 12 mg /24 hrs. during later months , it suggests serious foetal compromise in utero . It has also been shown from various studies that in 50% cases showing sustained low level of oestrogen there is evidence of growth retardation .and also as the precursor for placental progesteron is maternal LDL .c (Simpson & Associates,1954,Hellig & Associates 1970,Casey 1992) So by estimating maternal LDL plancetal production of progesterone can be estimated which is important for maintenance of pregnancy Intra uterine growth and it's aberrations are major concern of modern abstetrics because birth weight is the strongest indicator of perinatal mortality.

The birth weight depends upon both the gestational age and foetal growth . Although perinatal mortality is an outcome variable that is both clinically relevant and readily ascertainable , the morbidity associated with intra utrine growth retardation (IUGR) is also significant (Koops and associates , 1982).

The term intra utrine growth retardation is designated to indicate the fetus with birth weight less than 10th percentile or below 2 standard deviation of the mean for that period of gestational age . There are many factors associated with intra uterine growth retardation . Apart from fetal causes like chromosomal

abnormalities, congenital malformations, fetal infections and placental abnormalities, maternal causes are also very important. Among various maternal causes, important are maternal vascular diseases like pregnancy induced hypertension, chronic hypertension and advanced diabetes Mellitus, nutrition besides environment & Haematological causes.

Although studies have been done on lipid lipoproteins profile in female of various age groups and their relationship with different hormones, little attention has been given to its relationship with pregnancies complicated by toxæmia and intrauterine growth retardation

Before studying the changes in lipoprotein profile it is necessary to have some background knowledge about lipoprotein. Lipoproteins are of mainly five types - High density lipoprotein (HDL), Low density lipoprotein (LDL), very low density lipoprotein (VLDL), serum triglycerides (STG) and total serum cholesterol (STC). Lipids remain in plasma in complex form other than chylomicrons. Triglyceride transport is the major recognised function of serum lipoproteins. VLDL tells the function rate of hepatic triglyceride synthesis which in turn depends upon :-

- Rate of free fatty acid uptake from blood
- Fatty acid synthesis from glucose
- Extent of fatty acid oxidation
- Conversion of fatty acid to triglycerides.

VLDL transports triglycerides to muscle and other tissue as a source of energy. Ingestion of glucose decreases VLDL whereas increased level of VLDL has been related with obesity, high carbohydrate or low fat diet, ingestion of food in need and diminished level of HDL and LDL.

LDL is mainly derived from breakdown of VLDL in the circulation. LDL is increased by fat saturated fatty acids and cholesterol. Function is uncertain.

HDL is synthesized in the liver. HDL lipid serve as major substrate for lecithin cholesterol acyl transferase. HDL also function to transport cholesterol from peripheral tissues to the liver.

So with all these informations we decided to study the changes in lipoprotein profile in pregnancies complicated by PIH (pre-eclampsia and eclampsia) and IUGR during their antepartum, intrapartum and postpartum period in a group of females from Bundelkhand region.

AIMS & OBJECTIVES

AIMS AND OBJECTIVES

- To know the trend of changes in various lipoprotein fractions during ante partum period that is I and III trimeters of pregnancies complicated by toxæmia , eclampsia and intra uterine growth retardation (IUGR).
- To know the changes in lipoprotein profile brought about by labour in toxæmia , eclampsia and IUGR.
- To ascertain the trend of changes in levels of lipoproteins fraction brought about by immediate , early and late puerperium i.e. 24 hrs of post partum , 7 days post partum and 1 month post partum in pre-eclampsia , eclampsia and IUGR.
- To ascertain the effect of parity over the levels and trend of changes in various lipoproteins fractions in the pre-eclampsia & eclampsia.
- To compare the changes in various lipoprotein fractions in pre-eclampsia , eclampsia with good foetal outcome and bad foetal outcome.
- To compare changes in lipoprotein profile in pre-eclampsia eclampsia and intra utrine growth retardation during their antepartum , intra partum and post partum period.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

LIPID PROFILE DURING NORMAL PREGNANCY

It has been known for years that an increase in circulating lipids occurs during pregnancy. Even though cholesterol and other lipids have been the centre of considerable lay interest and also the subject of much scientific investigations relatively few reports have dealt with serial studies of lipids during pregnancy.

Based upon virtually no information, Becquerel and Rodier¹. In 1845 suggested that hyperlipaemia occurred during pregnancy. They hypothesized that this change represented an increase in blood cholesterol as well as increase in lipid phosphorous during pregnancy. Two years later Vershow² (1847) showed that the milky appearance of sera of some pregnant women was due to the presence of fat. The first clinical study was undertaken by Chauffard and Associates³. In 1911 who demonstrated an increase in blood cholesterol during pregnancy. In the same year Neumann & Herrmann⁴ studied the lipid particle in the whole blood and reported increase in cholesterol during pregnancy.

The development of micro methods made it possible to study blood lipids partitions accurately. It was not until 1934 when Boyd⁵ showed that the principle cause for the widely divergent results reported before that time was found to be the fact that some investigators were reporting determination performed on whole blood while other reports were based upon investigations of plasma and serum specimen. Dickmann's⁶ 1934 report dealt only with plasma cholesterol. Boyd found that almost no change occurred in lipid content of RBG during pregnancy, however striking changes were noted in the plasma lipids.

Different investigators have reported increased serum cholesterol level at different periods of gestation. Herrmann & Neumann (1972) analysed the serum of pregnant women and concluded that during first 6-7- months, serum cholesterol might be increased and that during the last two months an increase was the rule. Plass & Temkins⁷ (1923) also have given rising figures of cholesterol during pregnancy from 4th month till term. Tyler & Underhill⁸ 1929 determined that cholesterol and cholesterol ester increases gradually till term.

Gardner and Gainsborough^{9,10} (1929) reported that free cholestrol increases during pregnancy to the 30th week with a decrease in ester cholestrol to about the same time Bugnard¹¹, Columbus and gwilheim . Hinglais and Coverto (1940) found an increase in total cholestrol in later months of pregnancy.

Dickmann & Wagner¹² (1934) found the total cholestrol to increase to 23% above the first trimeter level , which decreases to 27% at eighth post -partum week from the values noted at term . This rise noted by Dickmann is considerably lower than De-Alvarez¹³ et al (1959) findings of 54% increase in third trimeter for total cholestrol and a 23% decrease in the values 6-7 weeks post partum for total cholestrol and as compared to the 3rd trimeter values. Oliver and Boyd¹⁴ (1955) after careful study of 12 normal primigravida stated that between 31st and 33rd week of pregnancy , there was a highly significant rise in plasma ester and total cholestrol . By the 20th week post partum these values decreased considerably but were all higher than the level at 12th week of pregnancy.

Mc. Eachern and Gilmour determined whole blood cholestrol in 12 pregnant women and concluded that marked elevation was found in about 30% of normal pregnant women beginning about 6th week prior to delivery and that about 80% had a level above normal on the first day after delivery. the figures were still higher on the 12th post partum day . Later on this increase in total serum cholestrol during pregnancy was also proved by Mullick and Bagga¹⁵ (1964) , Konttinen¹⁶ et al (1964) , Maria R . Waith et al (1975) , Kalkhoff¹⁷ (1978) , Darmandy¹⁸ et al 1982 .

Salamesh and Mastrogianis (1994) observed that plasma lipid lipoprotein undergo both qualitative and quantitative changes during pregnancy there is a gradual two to three tfold increase in triglyceride level and they reach their peak 1200 mg/dl to 3000 mg / dl . St term & gradually falls thereafter by 36 week of gestation , VLDL and other lipoprotein particles increase their triglyceride content proportionately to each other and to increase in serum triglyceride total cholestrol level at term, changes less dramatically with only a 50-6 changes in plasma lipid and lipoproteins during pregnancy are thought to b adaptive . The rise in plasma triglyceride provide maternal fuel saving the glucose for factor . The rise in 2 DL-C appears to be necessary for placental steriodogenesis . Hypcholestolemia caused by hypo betalipoprotein leads to decrease levels of estrogen and progesterone in affected pregnant women.

Hormones in pregnancy and their role in maintenance of pregnancy

1. Oestrogen - oestrial is the main pregnancy oestrogen which accounts for 80-90% of oestrogen formed in late pregnancy.

in classic experiment Ryan¹⁹ (1959) found that there is an exceptionally high capacity of placenta to convert certain C19 - steroids to oestrogen . The first proof that placenta uses plasma borne precursors as substrates for oestrogen biosynthesis shown by Baulieu and Bray (1963); Siiteri and Mac Donald²⁰ (1963)

Effects of oestrogen on lipid profile

Eilbert (1949) found that oestrogen administration to women evoked an increase in the plasma total lipids . Russ and Associates²¹ (1955) found that the administration of estrogen lowered the beta lipoproteins but raised the alpha lipoprotein Devi & Sharma²² (1972) , Gupta (1976) . Wallace²³ et al (1979) observed that total cholestrol LDL and VLDL all have been elevated in women using oral contraceptives.

As the hormones like oestrogen and progestrone are important for continuation of pregnancy . It has been shown that outcome can be predicted by the subsequent rise in pregnanedial output as pregnancy progressed (Machangetten and Michie , 1960).

In other study by Klopper & Billiwitz (1963) they have estimated oestrial excretion in successful pregnancy and habitual abortion and shown that oestrial output in successful pregnancy approximates closely to normal values which that of abortion fill week by week until 10 weeks it was less than 40% of normal²⁴

Progesterone -

After the first weeks of gestation very little of progesterone produced arises in the ovary (Diczfatury and Troen²⁵ , 1961) . Daily production rate of progesterone in late normal singleton pregnancy is about 250 mg (Pearlman²⁶ , 1957) . Progestrone levels in maternal peripheral plasma increases progressively with gestation.

Workers (1957) , Simpson and Colleagues (1954) found that perfusion of placenta in vitro with radiolabelled cholestrol resulted in formation of radiolabelled progesterone²⁷.

Hellig and associates (1970) also found that maternal plasma cholestrol was the principal precursor (upto 90%) of progesterone biosynthesis in human pregnancy²⁸

Simpson and associates demonstrated that trophoblast preferentially uses low density lipoprotein cholesterol for progesterone biosynthesis. This subject was reviewed recently by Casey and Colleagues²⁹ (1992)

Effect of progesterone on lipid profile -

Corredor et al (1970) found significant rise in triglyceride levels after 6-12 months use of oral pills. Barton in 1970 found significant rise in serum triglyceride levels in females using combined pills but there was no change seen with progestin only pills³⁰.

Spellacy (1976) observed the effect of norgestrel on carbohydrate and lipid metabolism there was no significant change in serum cholesterol levels.

Lauritzen in 1977 observed a decreasing effect of norethisterone on cholesterol and triglyceride levels of beta lipoprotein³¹. He also suggested that there is no influence of hydroxy progesterone on cholesterol level. Bradley et al (1978) found that progestins derived from 17 alpha hydroxy progesterone and others are relatively inert, while those derived from 19 . Nor testosterone (levonorgestrel , norethisterone acetate and others) decreases high density lipoproteins.

Krauss et al (1983) observed effects of two different progesterone pills and found that VLDL increased with only norgestrel . LDL was significantly lower in nor ethisterone group results were variable with very low density lipoproteins.

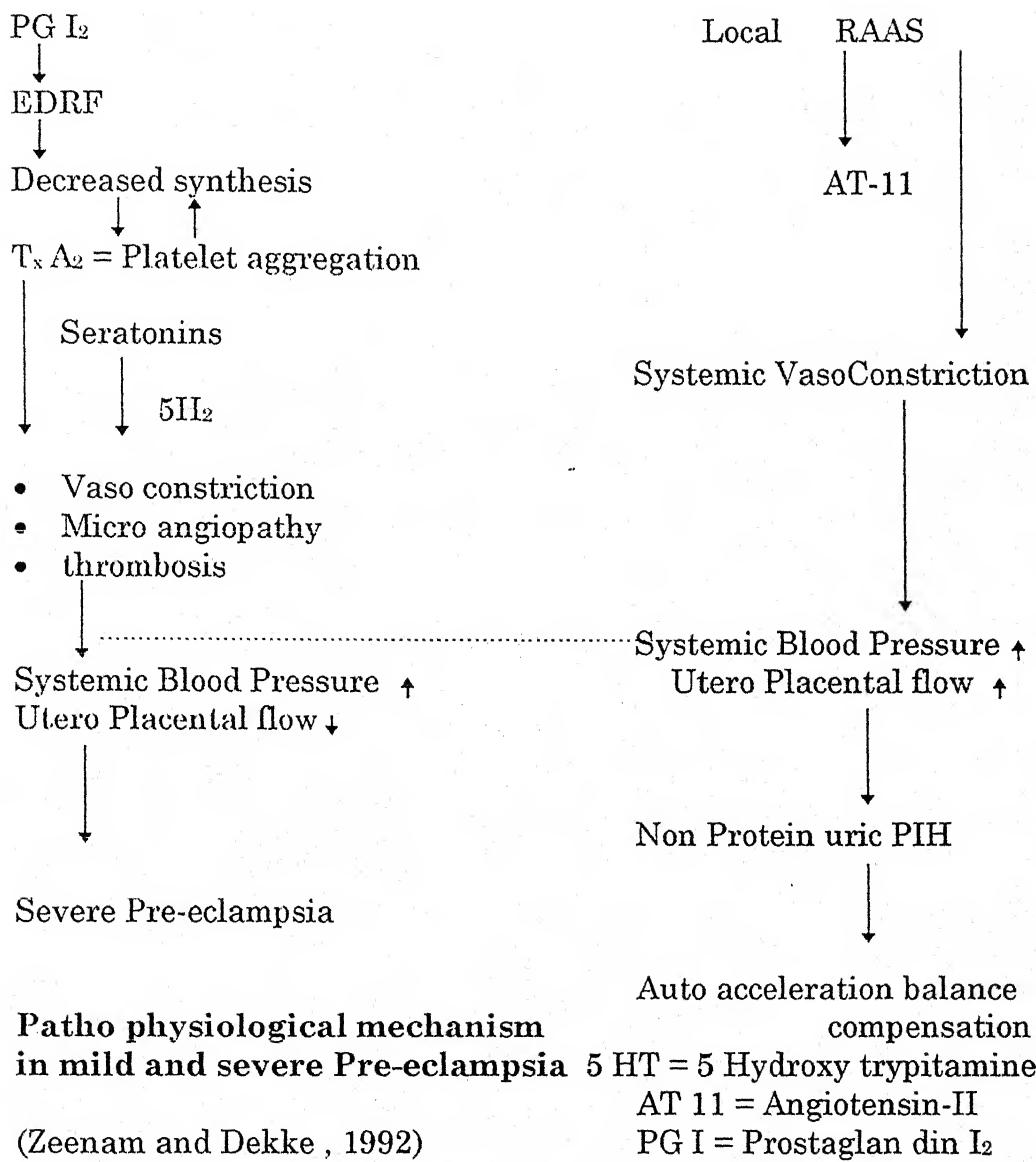
Lipoprotein in Toxaemic Mothers :-

The serum total cholesterol estimation was undertaken in 1911 by Chauffrd and Associates³² in three eclampsia patients and normal pregnant women . They reported an increase in the blood cholesterol during pregnancy but found no consistent variation in eclampsia mothers as compared to that of the conc. in the serum of healthy Gravidac a similar conclusion was made by several other investigators (Aunyenreith & Runk ; 1913 , Burgert Prener ; 1913 ; Schlimpert and Huffman , 1913 ; Huffmann 1955 ; Slemmon's & curtier , 1917 and Dickmann & Wegnar³³ 1934)

Boyd in 1935³⁴ reported plasma lipid in eclamptic mother . He observed mean value of total lipid to be 829 ± 255 mg/dl . In eclampsia and 785 ± 117 mg /dl in normal pregnancy. the mean cholesterol level was observed to be 187 ± 56 mg / dl and 179 ± 35 mg / dl respectively

The pathogenesis of pre-eclampsia :

Endothelial dysfunction -



$T_x A_2$ = Thromboxque A_2
 RAAS =Renin angiotensin aldosterone system

Neutral fat value were 219 ± 210 mg / dl and 248 ± 63 mg / dl , phospholipids were 361 ± 102 mg / dl and 293 ± 52 mg / dl in eclampsia and normal subjects relatively . However the ratio of phospholipid and cholesterol was found to be significantly higher in eclamptic patients than in other toxic or normal pregnancy.

Calvin et al (1939) found the initial cholesterol value of Toxaemic mother at third month to be 21 mg / dl which gradually rise in a fluctuating manner to 233 mg / dl in the 7th month then dropped sharply to 194 mg / dl in 8th month and 176 mg / dl in 9th month . During the time of pregnancy the basic metabolism was rising sharply in Toxaemic subjects .

Langer Crantz (1945) , Macy (1951) and Dickmann (1952) observed an increase in both serum protein and serum lipid in Toxaemia . Smith et al (1959) observed that cholesterol and lipid phosphorous increase as pregnancy progresses reaching their maximum at term. The percentage of lipoprotein showed a decline with progress of pregnancy specially during 3rd trimester.

De Alverz and Bratvold³⁵ (1961) studied total lipid in 7 normal pregnant women . the average mean value for total lipid during the last four weeks of normal pregnancy was 974 ± 154 mg / dl . The mean value for mild pre-eclampsia was significantly elevated [p.002] above the average value for normal pregnant women in third trimester . The women of severe Toxaemia were having total lipids almost 200 mg / dl above the mean level of normal pregnant level .

Arsoba and Kretowicz (1963) reported elevation in serum cholesterol , phospholipids and total lipid toxæmia of pregnancy.

Nelson³⁶ et al (1966) observed triglyceride content of placenta . In toxæmia simply reflect that placenta is disease organ in toxæmia and found raised level of both maternal & Foetal Phospholipids and triglycerides as compared with controls . However the elevation was not statistically significant.

Mullick & Bagga (1964) found a gradual increase in Beta- lipo - proteins and alpha lipoproteins ratio as pregnancy advances . Bhattachrya³⁷ et al (1969) concluded after their extensive study over normal & abnormal pregnancy that although cholesterol levels were slightly higher in toxæmia group , the cholesterol metabolism seemed to be similar in normal toxæmia of pregnancy.

In 1978 Chaturvedi , Tandon and Singh³⁸ observed that in toxæmia of pregnancy there was significant rise in total serum cholesterol as compared to the IIIrd trimester of normal pregnancy .

They also observed that in toxæmia serum cholesterol level did not return to same level as it did in the normal; pregnancy in post partum period and this was statistically significant . The level cholesterol had no significant relationship with the degree of hypertension in ante partum period . Mullick & Bugga³⁹ (1964) found a gradual increase in beta lipoproteins and beta and alfa lipoprotein ratio increases as pregnancy advances.

Warren⁴⁰ et al 1962 observed greatest increase in triglyceride followed by phospholipids and finally cholesterol in a pregnant female .

Pregnancy is associated with significant increase in VLDL and LDL conc. HDL2 generally shows a slight decrease whereas HDL3 is markedly increased leading to a significant increase in total HDL . Studies of Oliver and Boyd⁴¹ showed that beta/alfa ratio is even greater than the uncomplicated pregnancy . Increased HDL3 and decreased HDL2 are still demonstrable 6-9 months post partum and the beta / alpha ratio remains 4 : 1 five months post partum perio (HDL2 - Chol . page 325) Worth , Arky & Knopp . In 1975 reported a consistent increase in LDL:HDL lipoprotein ratios quantitatively greater increase in beta than in alpha function . They stated that triglyceride rises more than cholesterol and phospholipids and HDL cholesterol is not significantly reduced.

Pontis⁴² et al (1978) observed diminished percentage concentration of alpha lipoprotein with a concomitant elevation of percentage of beta lipoprotein at the first stage of labour and in Puerperium alterations towards normal non pregnant levels.

Ronald K . Kalkhoff (1978) stated that the hyper triglyceridemia of late pregnancy is mainly due to increase in VLDL concentration , constituents are proportional; and cholesterol , triglyceride and phospholipids are unchanged . Hyper triglyceridemia also due to increase in HDL and LDL in which triglyceride is reliably more . They also stated that Oestrogen is principle hormonal factor responsible for increased synthesis and release of endogenous triglyceride.

Knopp⁴³ et al 91981) stated that progressive hypertriglyceridemia of pregnancy is due to rise in VLDL triglyceride of particular interest was their finding of biphasic pattern in HDL cholesterol conc. with a peak in midgestation and then a subsequent decline towards non pregnant levels at term .

Dermandy⁴⁴ et al (1982) concluded that the primary changes in lipoprotein metabolism during pregnancy appears to be concerned with VLDL they observed pronounced elevation of VLDL conc. In

ultra centrifugal analysis of serum from pregnant women in 3rd trimester , compared with that from non pregnant women. After delivery the elevated serum triglyceride conc. decreases rapidly and the significantly greater utilization of serum triglycide in lactating women could be caused by the tissue specified direction of VLDL towards the mammary glands for milk synthesis.

Lipoprotein in IUGR (Intrauterine growth retardation)

In 1961 Warkany and co-workers⁴⁵ reported normal values for infant weights lengths & head circumferences and defined fetal growth retardation . In 1962 , WHO introduced the term low birth weight for all babies weighing less than 2.5 kg as a single category.

Gruenwald⁴⁶ (1963) reported that approximately one third of low birth weight infants were mature and their small size could be explained by chronic fetal distress probably due to placental insufficiency.

In 1963 Lubchenco & co-workers⁴⁷ from Denner published detailed comparison of gestational age to birth weights in an effort to derive norms for expected fetal size and therefore , growth at a given gestational week.

Battaglia and Zubchenko (1967) then classified small for gestational age (SGA) infants as those weighing below 10th percentile for their gestational age.

Kramer⁴⁸ (1987) reviewed 895 studies on fetal growth in english and french languages published between 1970 and 1984 and concluded that there was great confusion and controversy despite the profuse no. of studies . Problems with growth retarded fetuses - Wennergren and co-workers (1988) the neonatal performance of 160 infants defined to be growth retarded because their birth weight was a t or two standard deviation from the mean . In most cases 831 growth retardation has been suspected antenatally by birth weight less than 2 standard deviation of the mean for that period of gestation . hypoglycemia & Hypothermia occurred frequently . The major hazard of growth retardation were still birth and fetal distress . Similar observations have been made by Villar & Colleagues (1990)⁴⁹ for growth retardation at term and by Vesser & associates 1986) between 25 and 34 weeks.

Autopsy findings in small for gestational age (SGA) infants have revealed two basic pattern of impaired fetal growth (Gruenwald , 1963 , Naye and Kelly, 966) one was designated as symmetrical growth retardation because all body organs tend to be

proportionately reduced in size and assymetrical when some body organs are more affected than others.

Factors regulating fetal growth are mainly genetic and racial . Neonates of Indian and Chinese weigh less than those of Europeans of Africans (Ashcroft and Desai⁵⁰ , 1976) . Foetal growth is also influenced by the maternal weight , height , age , parity and duration of gestation . Social deprivation influences height & shorter women are not optimal reproduce as far as support of fetal growth is concerned (Gruenwald , 1968) .

Maternal & placenatl causes are also important . Hypertension during pregnancy causes IUGR . It varies with mean arrterial pressure at 4-6 months higher it is lower the birth weight (Page and Christiansons(1976).

Boyd & Scott⁵¹ (1958) showed that compared to normal placenta in pre-eclampsia and IUGR were of a lower volume of Parenchyma and Villious surface with increased area of infarction.

Peor maternal nutritional status also affects fetal growth . Pregnancy weight of 40 kg or below , poor weight gain in pregnancy (less than six kg) , anaemia (Hb less than 8 gm / dl) and mid arm circumference (less than 20 cms) were associated with low birth weight babies (Jayam et al , 1984) . Acute starvation restricts fetal growth with birth weight of 300-400 gm due to loss of body fat (Hytten , 1979) with nutritional supplemenyts (Calories , protein , Iron < Folic acid) in the 2nd half of pregnancy there is fetal Odycst gain of over 200 gm , compared with controls . (Ven katachalam , 1962 , Iyengar & Rajalakshmi , 1974 ; lachting et al , 1975)^{52,53}

Biale⁵⁴ (1983) studied lipolytic activity in the placenta of chronically deprived featuers , concluded that lipoprotein lipase activity was significantly greater in placentas of pre-eclamptic women and in placenta of intra uterine growth retarded features.

Iwaszkiewicz , Pawlowska⁵⁵ (1986) found that pregnancy complicated by intra utrine growth retardation , the free fatty acids concentration in amniotic fluid was almost three times higher than in normal pregnancy.

In 1980 Economide & Crook⁵⁶ showed that small for gestationalage fetuses had hyper triglyceridemia and hypo glycemia and hypoinsulinemia.

Recently Berg , Ronald , Sande⁵⁷ (1994) found that high lipoprotein (9) [Lp (9)] level in maternal serum can interfere with placental circulation and causes fetal growth retardation.

MATERIAL & METHODS

MATERIAL & METHOD

The present study was carried out in the Department of Medicine and department of obstetrics and gynaecology, MLB, Medical college Jhansi , over a period of one year starting from March 97 to March 98.

SELECTION OF CASES :-

The study comprised of patients attending outdoor clinic of the department of obstetrics and Gynaecology for Ante natal examination , Antenatal wards , Eclampsia room and from labour room directly. The pts studied were broadly divided into following groups :-

Group A - Pre eclamptic toxæmia group

Group B - Eclampsia group

Group C - Pts with Intra uterine growth retardation (IUGR Group)

PRE - ECLAMPTIC PATIENTS

Were taken to be those who developed hypertension after 20th week of gestation with the following associated conditions .

- a) Proteinuria and or
- b) Oedema or
- c) Both a & b

HYPERTENSION -

An absolute rise in B.P. of at least 140 / 90 mm Hg, if the previous B.P. is not known or a rise in systolic pressure of at least 30 mm Hg or a rise in diastolic pressure of at least 15 mm Hg over the previously known B.P. is being considered as criteria for Toxaemic hypertension . The B.P. cited must manifest on atleast two occasions 6 hrs. or more apart.

PROTEINURIA :-

It is defined as more than 0.3 gm/lt in 24 hrs. collection or greater than 1 gm/lt in at least two random urine specimens collected 6 hrs or more apart.

OEDEMA :-

Demonstration of pitting Oedema over the ankles after 12 hrs bed rest or rapid gain in weight more than 5 pounds a month in later month.

Eclamptic pts. were taken to be those who developed convulsions and / or coma , not caused by any coincidental neurologic disease such as epilepsy and fulfilled all the conditions set fourth for pre- eclamptic patients as taken above.

PATIENTS WITH INTRA UTERINE GROWTH RETARDATION :-

(IUGR Group) \Rightarrow This group included pregnant woman who had on clinical evaluation the fundal height of uterus being less by at least four weeks from the expected period of Gestation (on the basis of LMP) and later confirmed by ultra sonography.

Total no. of cases studied were 50 , 13 cases did not return at different stages of follow - up so 13 cases were excluded from the study , so total number of cases were 37 , out of which 10 cases were of pre eclampsia ,

17 cases were of eclampsia and 10 cases were of (I.U.G.R.).

CLINICAL EXAMINATION :-

A complete clinical history of the above cases regarding age , parity , socio-economic status , literacy level , history of present pregnancy , past history , obstetrical history , menstrual history , family history , dietary history was taken as described in format . It was ensured that pt did not suffer from any other disease which caused increased cholestrol level such as coronary heart disease , renal disease , liver disease and diabetes mellitus. Complete general and systemic examination was done with special emphasis on - general built , pallor , height and weight , blood pressure and to rule out other disease which can cause altered lipid profile. The pts. were examined and investigated in detail to detect Toxaemia of pregnancy . Most of the pts. in eclamptia group were in the last trimester of pregnancy nearing term . Fundal height was assessed and the period of Gestation was determined and it was ascertained if this corresponds to period of amenorrhoea as told by the pt. Per vaginal examination was done specially in pts. having labour pains to ascertain whether she was in labour or not , so that blood sample could be taken at appropriate time. Patients who were diagnosed as having pre eclampsia or I.U.G.R. in IInd trimester were called again for regular follow up in the subsequent trimester of pregnancy to ensure best possible outcome of those pregnancies.

Investigations:

Following investigations were performed.

I. Routine :- Haemoglobin , TLC , DLC , ESR , GB.P.

Blood group

Blood sugar

Blood urea

Blood urea , S. Creatinine , S. uricacid , liver function tests were specially done in cases of pre eclampsia and eclampsia.

Urine :- (albumin) Protein (quantitative by Esbach method)

Sugar

Microscopic

II. Lipoprotein profile :-

Serum total cholesterol

Low density lipoprotein

Very low density lipoprotein

High density lipoprotein

Serum triglyceride.

III. For I.U.G.R. Group specially

V D R L

T O R C H infection

Ultra sonography

Period of collection of blood samples :-

1. Antenatal period

- a) One sample from 13th to 28th week (In pre eclampsia IUGR Group)
- b) One sample from 28th week to 40th week.

2. During labour

3. Within 24 hrs. of parturition

4. After one week of delivery

5. At 30th day after delivery .

METHOD OF COLLECTION OF BLOOD SAMPLES :-

- 5 ml of blood was withdrawn from the patients having fasted for 12-14 hrs. (wherever it was possible) without any venous stasis in recumbent posture with full aseptic precaution.
- After withdrawing the sample , it was allowed to settle , facilitating the serum to separate , then centrifuged and serum was preserved with standard precautions.

ESTIMATION OF LIPID FACTORS :-

Various lipid factors - Serum Total Cholestrol (STC) , Serum triglyceride (STG) , High density lipoprotein (HDL) were estimated with standard diagnostic kits while low density lipoprotein (LDL) and very low density lipoprotein (VLDL) were derived from values of above mentioned lipids by formulae.

- 1) Serum Total Cholestrol :- STC was estimated by Wyenbenga and Pileggi (1970) method utilising commercial kit supplied by ETHNOR . The basic principle is that Chalerlerel reacts with test solution of ferric Perchlorate , ethyl acetate and sulphuric acid and gives a lavender coloured complex which is measured calorimetrically
- 2) Serum Triglyceride (STG) :- It was estimated by acetyl acetone method . Principle behind is that Triglycerides are determined by measuring glyceral afre it's liberation from fatty acid by saponification . Glycerol is oxidised by sodium meta periodate to formaldehyde which is directly proportional to the amount of triglycerides.
- 3) High density lipoprotein :- HDL was estimated by commercial kits supplied by ETHNOR . Basic principle is that the HDL cholestrol fraction is seperated by using a precipitating reagent . The precipitate contains chylomicrons , VLDL , LDL which are removed by centrifugation . the supernatant contains HDL cholestrol which is estimated by HDL-C color reagent which gives purple coloured complex which is measured calorimetrically at 560 nm (560 - 600 nm) . The intensity of color developed is proportional to the concentration of HDL-C in the specimen under test.
- 4) Very low density lipoprotein :- It was calculated by formula given by Friedwald et al (1972) . This formula is valid upto STG values less than 400 mg %.
- 5) Low density lipoprotein :- It was calculated by formula given by Fredrickson D.A. (1972)

$$\text{LDL (mg / dl)} = \text{STC} - (\text{STG}/5 + \text{HDL})$$

or

$$\text{LDL (mg / dl)} = \text{STC} - (\text{VLDL} + \text{HDL})$$

OBSERVATIONS

Statistical Ananlysis

"t" Value was calculated by -

1. For comparison in the same group -

$$t = \frac{\bar{d}}{S(\bar{d}) / \sqrt{n}}$$

$$S(d) = \sqrt{\frac{1}{n} \sum d^2 - n \bar{d}^2}$$

Degree of freedom (D.F.) = $n - 1$

2. For comparison in different groups -

$$f = \frac{\bar{X}_1 - \bar{X}_2}{S \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \quad S = \frac{(n_1 - 1) SD_1 + (n_2 - 1) SD_2}{n_1 + n_2 - 2}$$

Degree of freedom (D.F.) $n_1 + n_2 - 2$

$p > .05$ not significant

$p < .05$ Significant

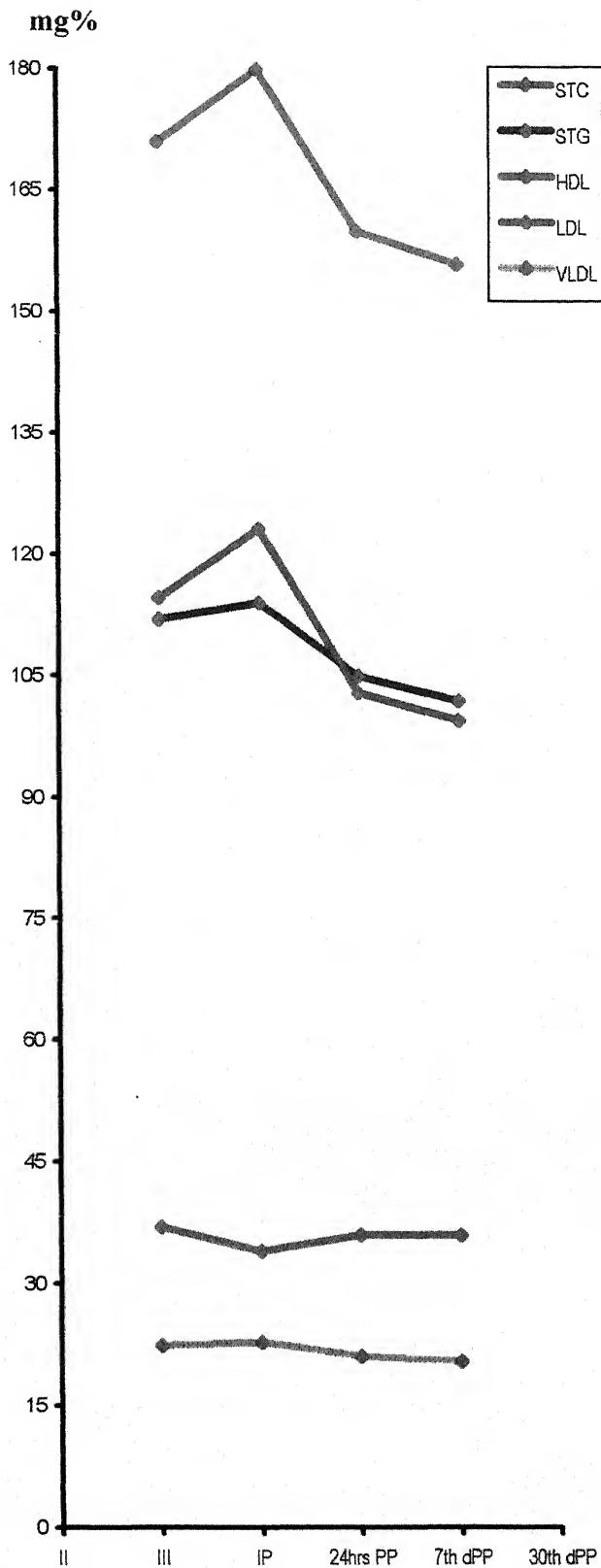
$p < .01 \text{ & } < .001$ Highly Significant

While comparing two groups only those cases who had representation in both groups, were considered for stastical Analysis.

TABLE II
serum lipoprotein profile in cases of preeclampsia during antepartum , intrapatum and post partum period .

	II trimester	III trimester	IP period	24 hrs PP	7th day PP	30th day PP
STC mg % mean \pm SD	178.33 \pm 21	196.77 \pm 30	207.8 \pm 28.86	183.2 \pm 25.83	174.22 \pm 26.9	172.5 \pm 33.24
STG mg % mean \pm SD	97.2 \pm 16	106.66 \pm 20.5	110 \pm 20.33	99.9 \pm 19.2	92 \pm 19.54	89.5 \pm 22.5
HDLmg % mean \pm SD	34.8 \pm 4.58	33.52 \pm 5.52	32 \pm 4.12	34 \pm 4.61	35 \pm 2.76	35 \pm 3.36
LDL mg % mean \pm SD	123.9 \pm 14.94	140.56 \pm 22.48	152.98 \pm 22.5	127.9 \pm 20.0	119.8 \pm 21.01	116.1 \pm 24.49
VLDL mg % mean \pm SD	19.28 \pm 3.3	21.2 \pm 4.47	22.1 \pm 3.89	20.38 \pm 4.74	18.5 \pm 4.11	17.9 \pm 4.5
no of Cases	5	9	10	10	9	4

PRE ECLAMPSIA GROUP



Case no 1

*Patient - Manorama
23yrs*

- * *Primi Gravida*
- * *Middle Socioeconomic Status*
- * *Vegetarian*
- * *C/o Swelling over feet*
- * *Paedal oedema present*
- * *BP 146/96 mm Hg*
- * *Obstetrical & other systemic examination NAD*
- * *Urine - Albumin absent*
- * *LFT & RFT normal*
- * *No complications*
- * *Out come \Rightarrow F.T.N.D, male baby wt.2.8 kg.*

Values mg%

	II	III	IP	24hrs period	7th PP	30th dPP
STC	-	171	180	160	156	-
STG	-	112	114	105	102	-
HDL	-	37	34	36	36	-
LDL	-	114.6	123.2	103	99.6	-
VLDL	-	22.4	22.8	21	20.4	-

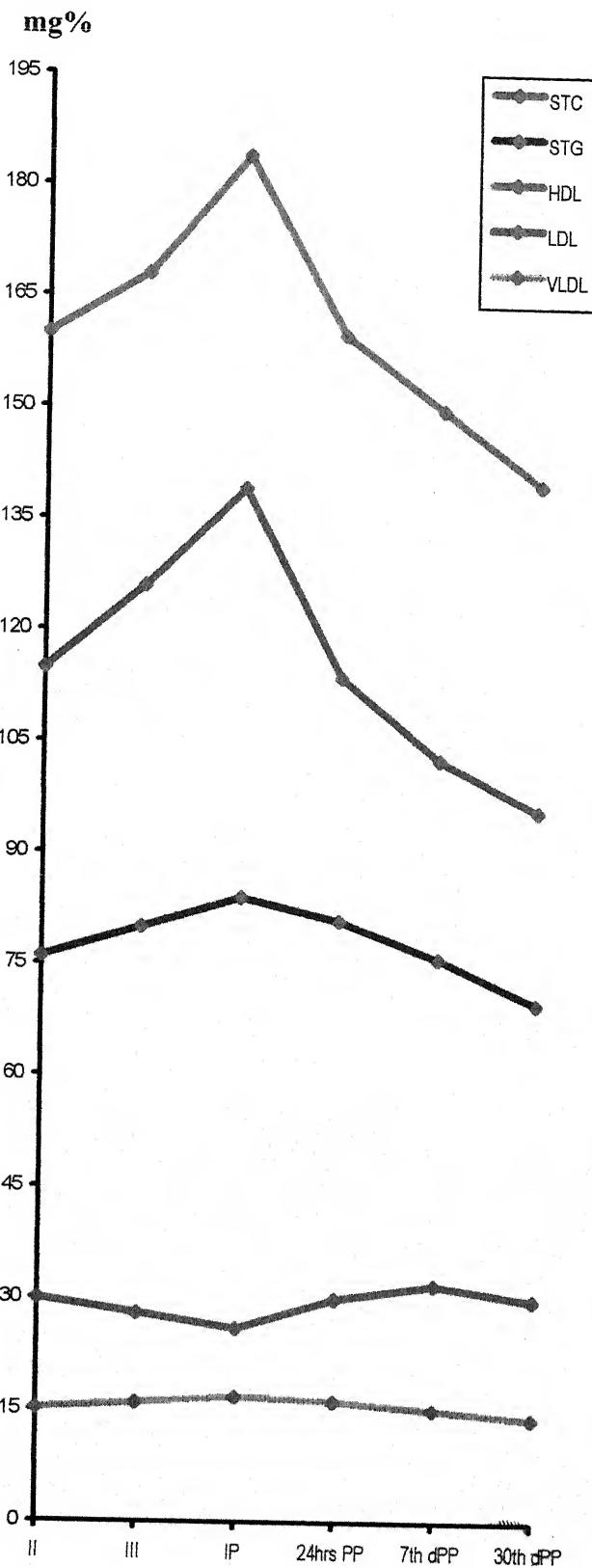
STC 1mmol/L = 38.76mg%

STG mmol/L = mg% \times 0.0114

HDL mmol/L = mg% / 38.76

Legend :

- * *5.26% \uparrow in STC, maximum value during labour*
- * *11.1% \downarrow in STC, with in 24hrs PP*
- * *9% \uparrow in LDL, maximum value during labour*
- * *17% \downarrow in LDL, with in 24hrs PP*
- * *8% \downarrow in HDL, up to labour*



PRE ECLAMPSIA GROUP

Case no 2

Patient - Mamta Jain
21 yrs

- * *Primi Gravida*
- * *Middle Socioeconomic Status*
- * *Vegetarian*
- * *C/o Swelling over feet*
- * *Paedal oedema present*
- * *BP 150/100 mm Hg*
- * *Obstetrical & other systemic examination NAD*
- * *Urine - Albumin Present*
- * *LFT & RFT normal*
- * *No complications*
- * *Out come \Rightarrow F.T.N.D, female baby wt. 2.6 kg.*

Values in mg%

	II	III	IP	24hrs period	7th PP	30th dPP
STC	160	168	184	160	150	160
STG	76	80	84	81	76	70
HDL	30	28	26	30	32	30
LDL	114.8	126	139.2	113.8	102.8	96
VLDL	15.2	16	16.8	16.2	15.2	14

STC 1mmol/L = 38.76mg%

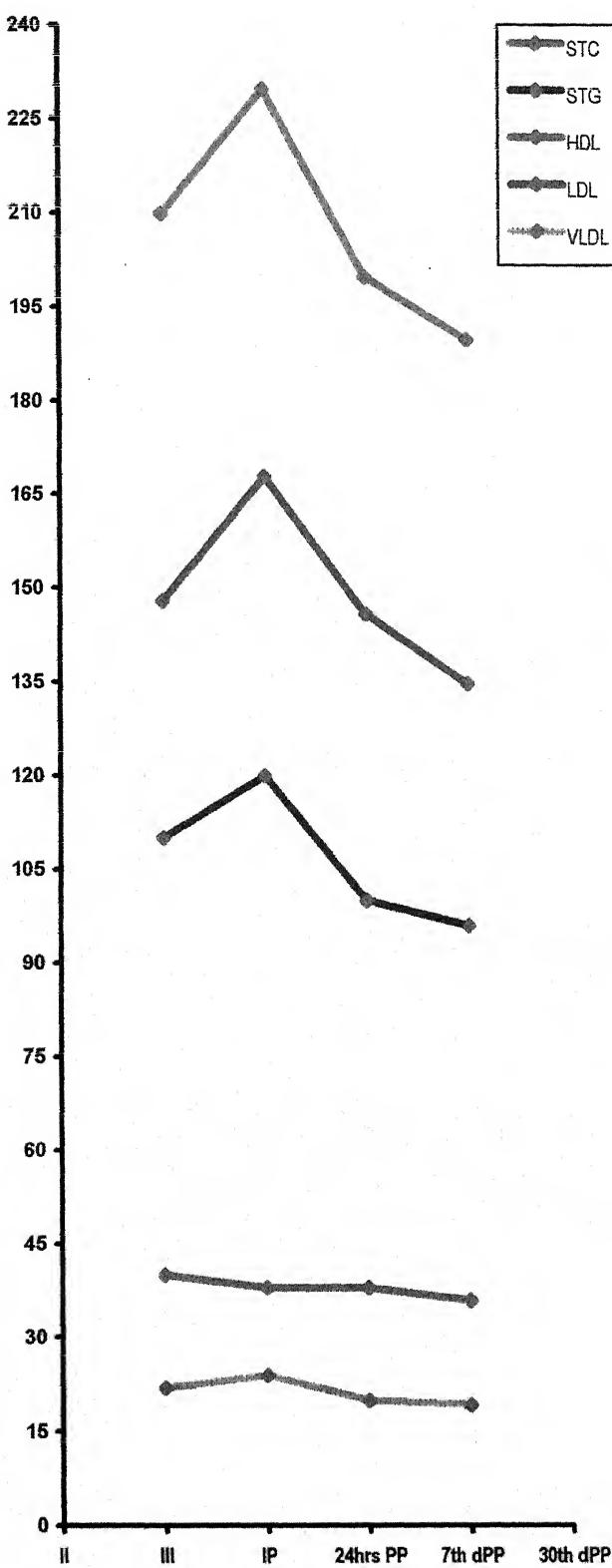
STG mmol/L = mg% $\times 0.0114$

HDL mmol/L = mg% / 38.76

Legend :

- * 15% \uparrow in STC, maximum value during labour
- * 15% \downarrow in STC, with in 24hrs PP
- * 16% \uparrow in LDL, maximum value during labour
- * 16% \downarrow in LDL, with in 24hrs PP
- * 11% \downarrow in HDL, up to labour

mg%



PRE ECLAMPSIA GROUP

Case no 3

*Patient - Parvati
20yrs*

- * *Primi Gravida*
- * *Lower Socioeconomic Status*
- * *Vegetarian*
- * *C/o Excessive gain in body weight*
- * *Paedal oedema present*
- * *BP 160/104 mm Hg*
- * *Obstetrical & other systemic examination NAD*
- * *Urine - Albumin present*
- * *LFT Normal & RFT Impaired*
- * *Developed renal failure*
- * *Outcome \Rightarrow F.T.N.D, female baby wt. 2.6 kg.*

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	-	210	230	200	190	-
STG	-	110	120	100	96	-
HDL	-	40	38	38	36	-
LDL	-	148	168	146	134.8	-
VLDL	-	22	24	20	19.2	-

STC 1mmol/L = 38.76mg%

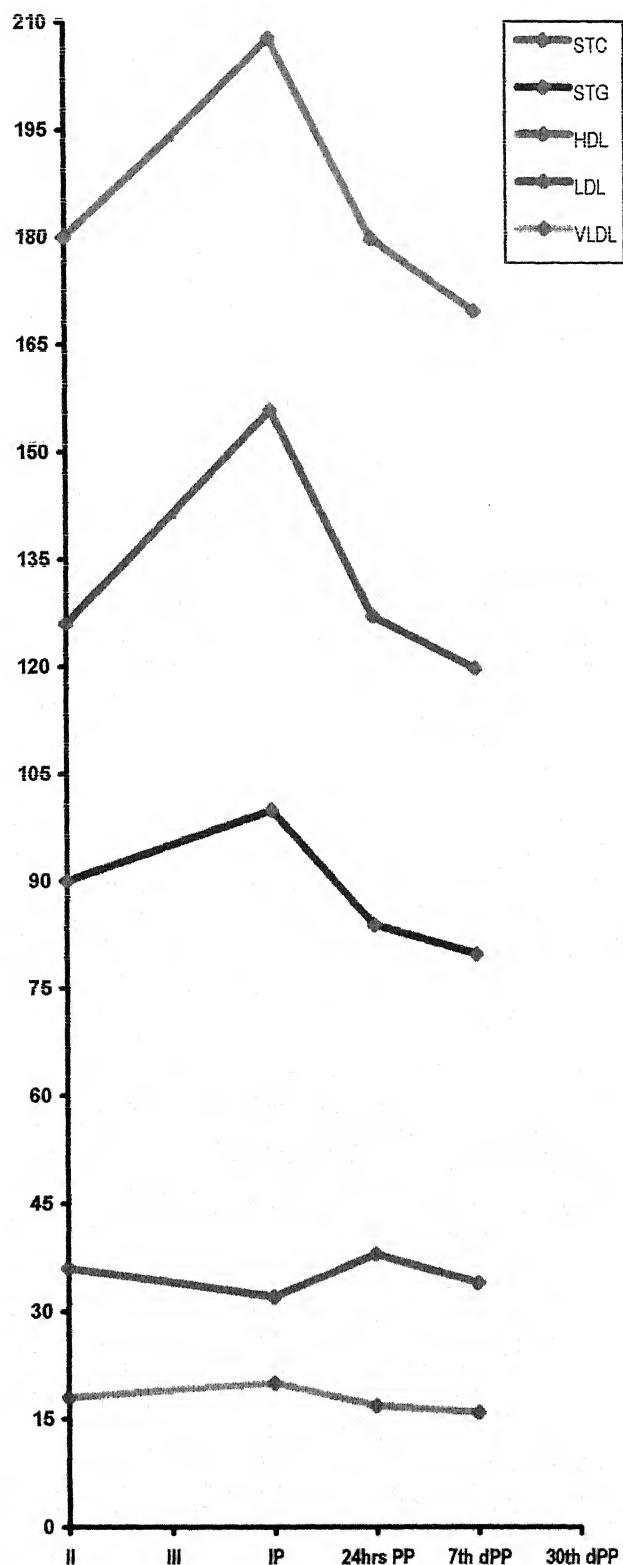
STG mmol/L = mg% \times 0.0114

HDL mmol/L = mg% / 38.76

Legend:

- * *10% \uparrow in STC, maximum value during labour*
- * *13% \downarrow in STC, with in 24hrs PP*
- * *13% \uparrow in LDL, maximum value during labour*
- * *18% \downarrow in LDL, with in 24hrs PP*
- * *5% \downarrow in HDL, up to labour*

mg%



PRE ECLAMPSIA GROUP

Case no 4

*Patient - Pupali Rai
26yrs*

- * *G₂ P₂ L₂*
- * *Upper Socioeconomic Status*
- * *Non - Vegetarian*
- * *Detected on routine checkup*
- * *Paedal oedema present*
- * *BP 148/92 mm Hg*
- * *Obstetrical & other systemic examination NAD*
- * *Urine - Albumin absent*
- * *LFT & RFT Normal*
- * *No complications*
- * *Out come ⇒ Elective C S, male baby wt.2.9 kg.*

Values mg%

	II	III	IP	24hrs period	7th PP	30th dPP
STC	180	-	208	180	170	-
STG	90	-	100	84	80	-
HDL	36	-	38	32	38	-
LDL	126	-	156	127.2	120	-
VLDL	18	-	20	16.8	16	-

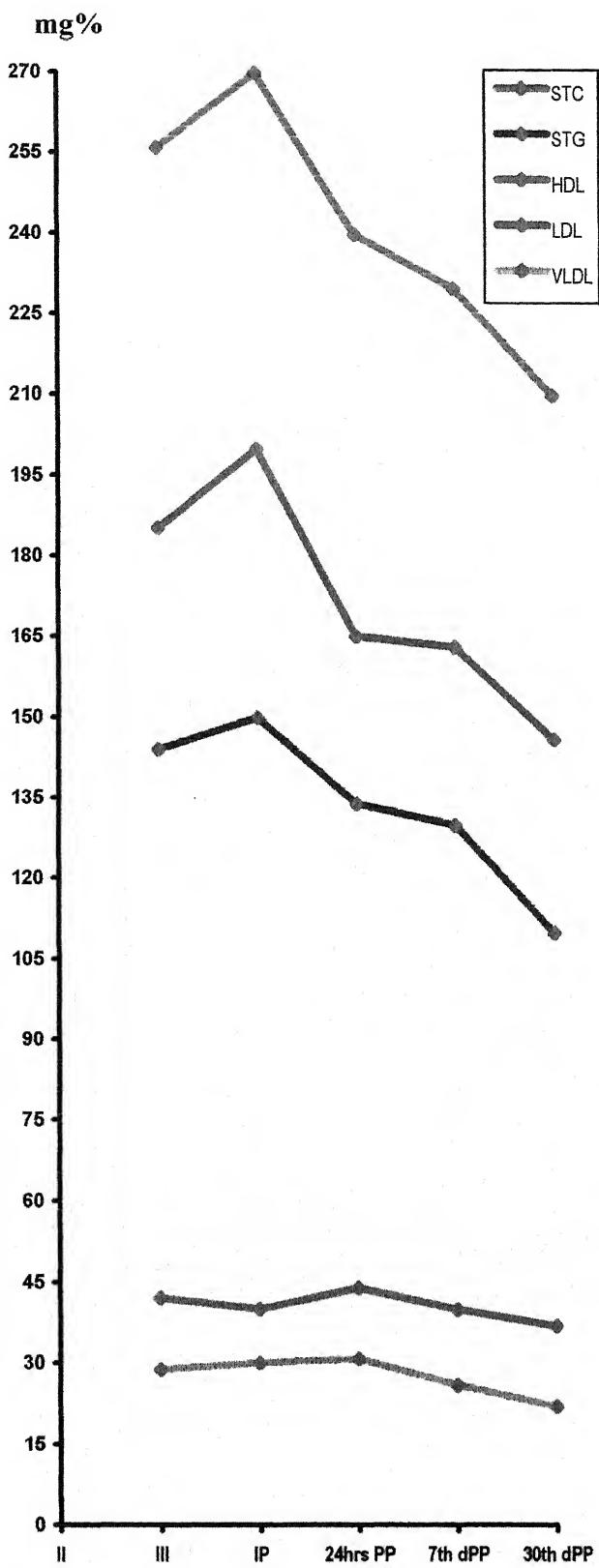
STC 1mmol/L = 38.76mg%

STG mmol/L = mg% × 0.0114

HDL mmol/L = mg% / 38.76

Legend :

- * *16% ↑ in STC, maximum value during labour*
- * *14% ↓ in STC, with in 24hrs PP*
- * *16% ↑ in LDL, maximum value during labour*
- * *13% ↓ in LDL, with in 24hrs PP*
- * *11% ↓ in HDL, up to labour*



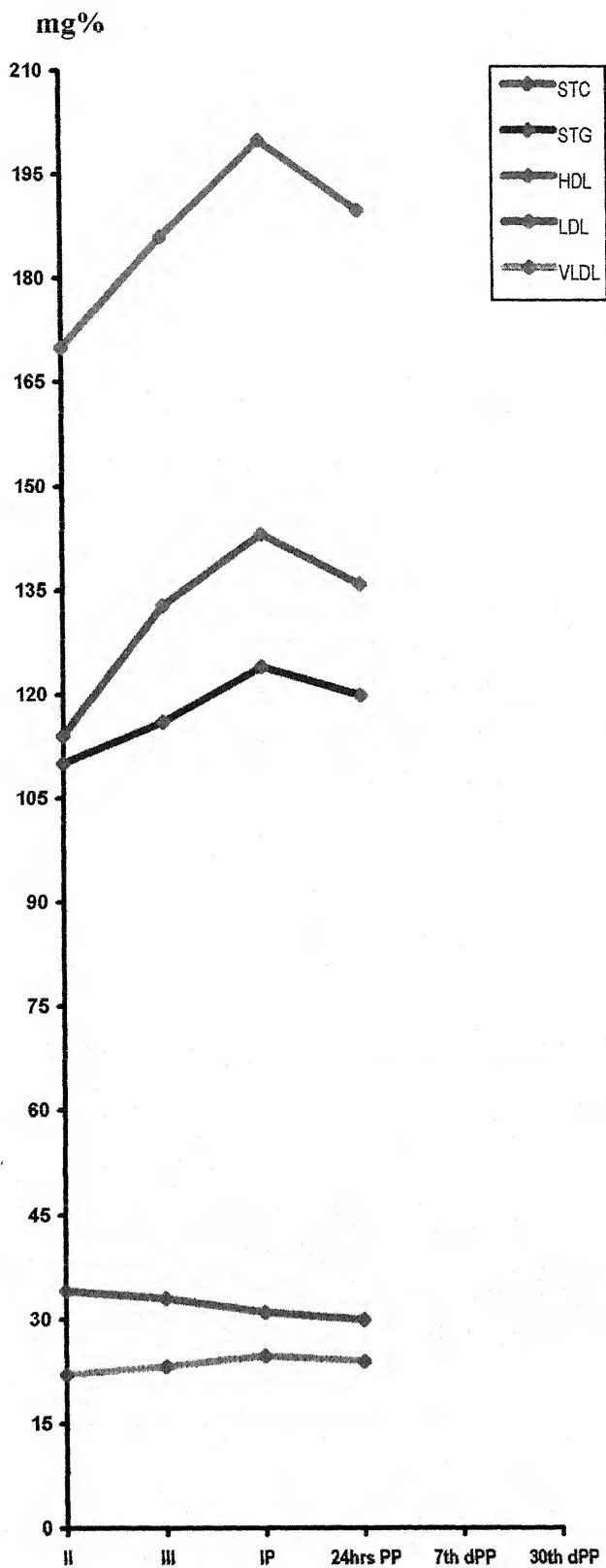
PRE ECLAMPSIA GROUP

Case no 5

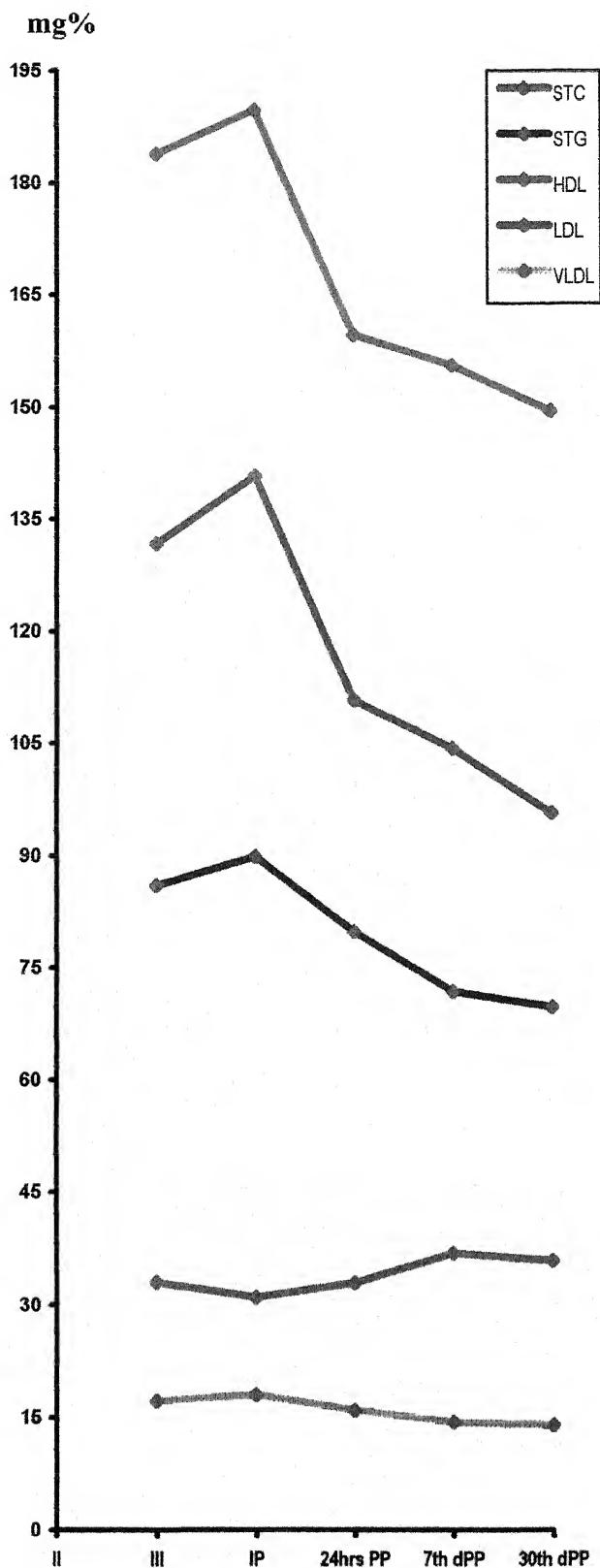
Patient - Sangeeta
22yrs

- * *Primi Gravida*
- * *Upper Socioeconomic Status*
- * *Non - Vegetarian*
- * *C/o Swelling over feet*
- * *Paedal oedema present*
- * *BP 156/100 mm Hg*
- * *Obstetrical & other systemic examination NAD*
- * *Urine - Albumin absent*
- * *LFT & RFT Normal*
- * *No complications*
- * *Out come ⇒ F.T.N.D, male baby wt. 2.8 kg.*

PRE ECLAMPSIA GROUP



PRE ECLAMPSIA GROUP



Case no 7

Patient - Guddi
22 yrs

- * *G2P2L2*
- * *Lower Socioeconomic Status*
- * *Vegetarian*
- * *C/o Excessive gain in bodyweight*
- * *Paedal oedema present*
- * *BP 148/104 mm Hg*
- * *Obstetrical & other systemic examination NAD*
- * *Urine - Albumin absent*
- * *LFT & RFT Normal*
- * *No complications*
- * *Out come \Rightarrow F.T.N.D, female baby wt. 2.6 kg.*

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	-	184	190	160	156	150
STG	-	86	90	80	72	70
HDL	-	33	31	33	37	36
LDL	-	131.8	141	111	104.6	96
VLDL	-	17.2	18	16	14.4	14

STC 1mmol/L = 38.76mg%

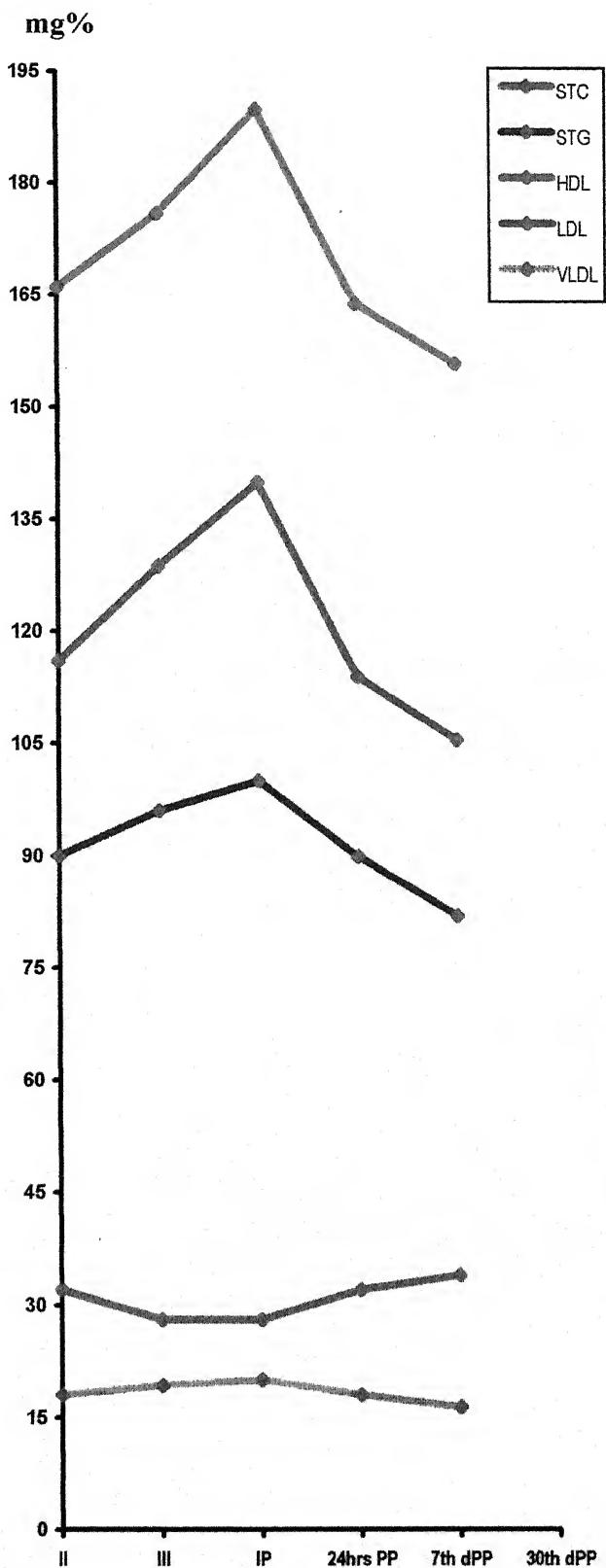
STG mmol/L = mg% $\times 0.0114$

HDL mmol/L = mg% / 38.76

Legend :

- * *4% \uparrow in STC, maximum value during labour*
- * *16% \downarrow in STC, with in 24hrs PP*
- * *9% \uparrow in LDL, maximum value during labour*
- * *23% \downarrow in LDL, with in 24hrs PP*
- * *6% \downarrow in HDL, up to labour*

PRE ECLAMPSIA GROUP



Case no 8

*Patient - Sudha
24yrs*

- * *Primi Gravida*
- * *Lower Socioeconomic Status*
- * *Vegetarian*
- * *Detected on routine checkup*
- * *Paedal oedema Absent*
- * *BP 180/110 mm Hg*
- * *Obstetrical & other systemic examination NAD*
- * *Urine - Albumin present*
- * *LFT & RFT Normal*
- * *Out come \Rightarrow Premature
Vaginal delivery, female baby
wt. 2.0 kg.*

Values mg%

	II	III	IP	24hrs period	7th PP	30th dPP
STC	166	176	190	190	164	156
STG	90	96	100	100	90	82
HDL	32	28	28	28	32	34
LDL	116	128.8	128.8	140	114	105.6
VLDL	18	19.2	19.2	20	18	16.4

STC 1mmol/L = 38.76mg%

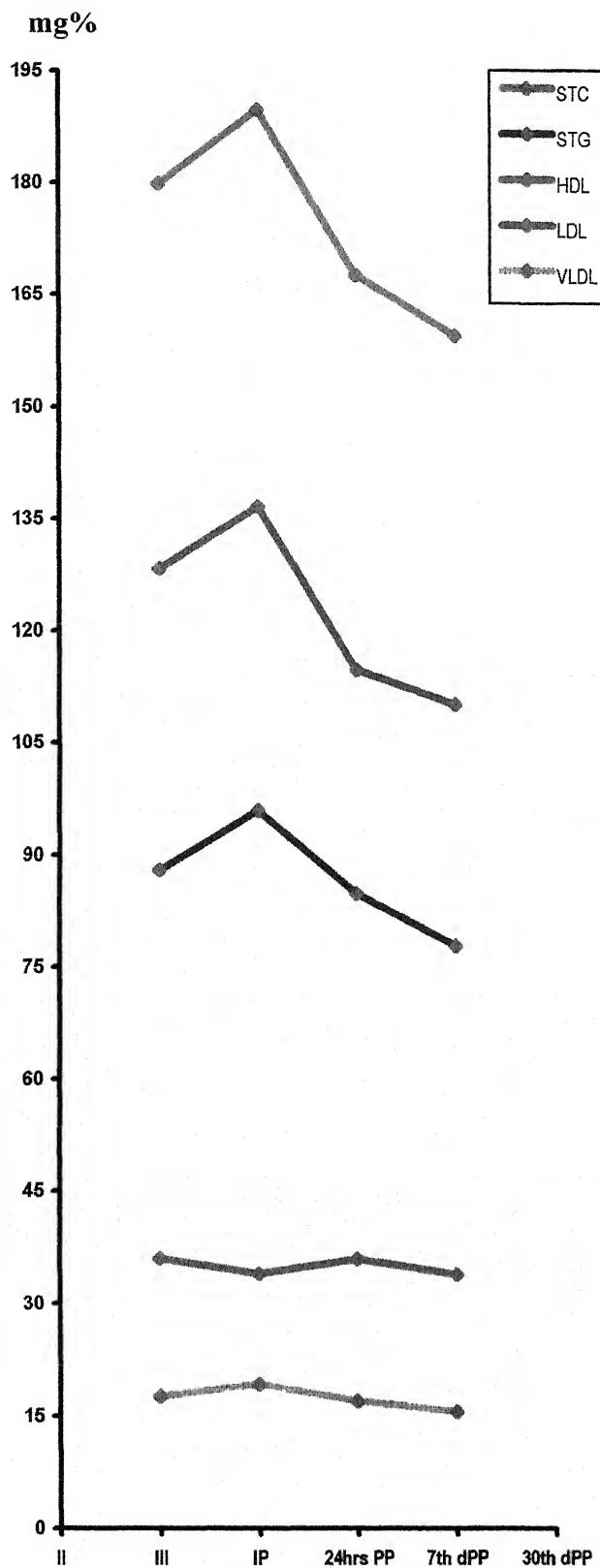
STG mmol/L = mg% $\times 0.0114$

HDL mmol/L = mg% / 38.76

Legend :

- * *15% \uparrow in STC, maximum value during labour*
- * *14% \downarrow in STC, with in 24hrs PP*
- * *19% \uparrow in LDL, maximum value during labour*
- * *19% \downarrow in LDL, with in 24hrs PP*
- * *12% \downarrow in HDL, up to labour*

PRE ECLAMPSIA GROUP



Case no 9

Patient - Kiran
24yrs

- * G3P2L2
- * Middle Socioeconomic Status
- * Non Vegetarian
- * C/o Swelling over feet
- * Paedal oedema present
- * BP 152/96 mm Hg
- * Obstetrical & other systemic examination NAD
- * Urine - Albumin present
- * LFT Impaired & RFT Normal
- * Out come \Rightarrow F.T.N.D, female baby wt. 2.25 kg.

Values mg%

	II	III	IP	24hrs period	7th PP	30th dPP
STC	-	180	190	168	160	-
STG	-	88	96	85	78	-
HDL	-	36	34	36	34	-
LDL	-	128.4	136.8	115	110.4	-
VLDL	-	17.6	19.2	17	15.6	-

STC 1mmol/L = 38.76mg%

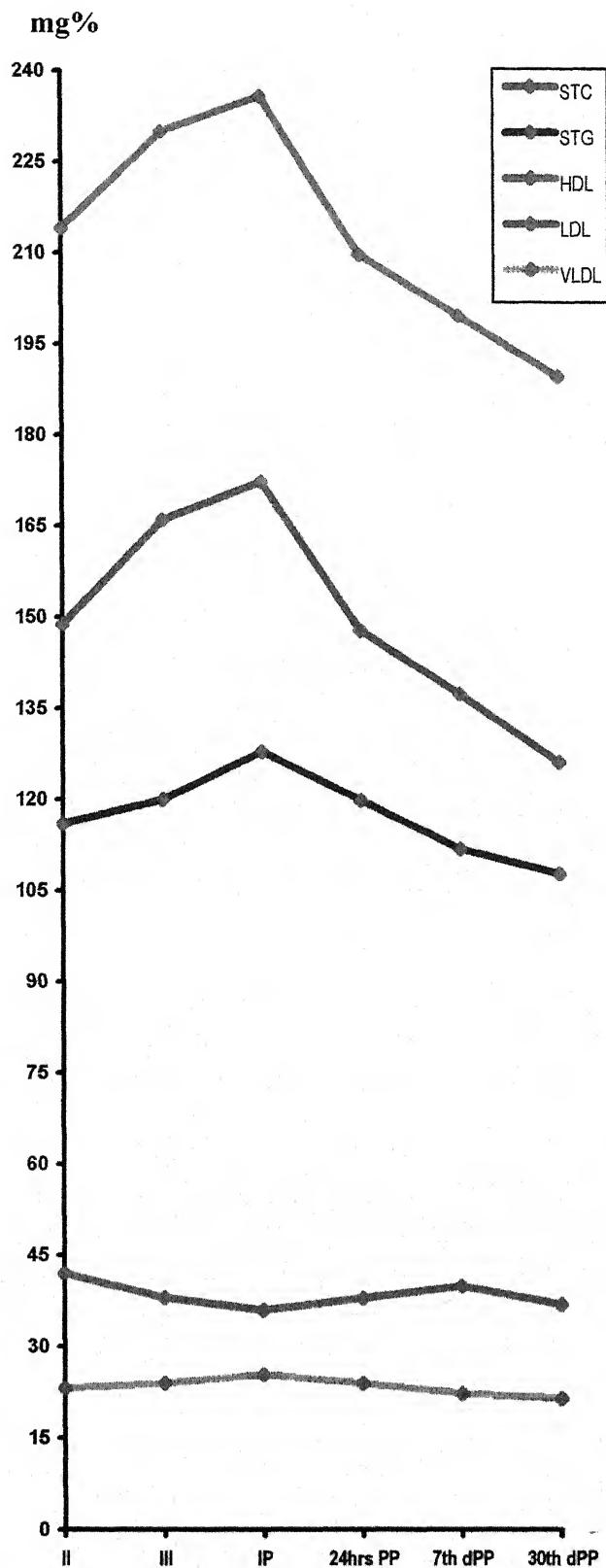
STG mmol/L = mg% \times 0.0114

HDL mmol/L = mg% / 38.76

Legend :

- * 6% \uparrow in STC, maximum value during labour
- * 12% \downarrow in STC, with in 24hrs PP
- * 9% \uparrow in LDL, maximum value during labour
- * 16% \downarrow in LDL, with in 24hrs PP
- * 6% \downarrow in HDL, up to labour

PRE ECLAMPSIA GROUP



Case no 10

Patient - Vimla
22 yrs

- * *Primi Gravida*
- * *Lower Socioeconomic Status*
- * *Vegetarian*
- * *C/o Swelling over feet*
- * *Paedal oedema present*
- * *BP 148/104 mm Hg*
- * *Obstetrical & other systemic examination NAD*
- * *Urine - Albumin absent*
- * *LFT & RFT Normal*
- * *Out come \Rightarrow Premature Vaginal delivery male baby*

wt. 2.4 kg.

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	214	230	236	210	200	190
STG	116	120	128	120	112	108
HDL	42	38	36	38	40	37
LDL	149	169	172	148	137.6	126.4
VLDL	23	24	25.6	24	22.4	21.6

STC 1 mmol/L = 38.76 mg%

STG mmol/L = mg% $\times 0.0114$

HDL mmol/L = mg% / 38.76

Legend :

- * 11% \uparrow in STC, maximum value during labour
- * 13% \downarrow in STC, with in 24hrs PP
- * 14% \uparrow in LDL, maximum value during labour
- * 12% \downarrow in LDL, with in 24hrs PP
- * 11% \downarrow in HDL, up to labour

Table II shows that STC level raised from 178.33 ± 21 to 196.77 ± 30 from IInd trimester to IIIrd trimester and reaching a peak during intra partum period of 207.8 ± 28.86 mg % this rise from IInd trimester to intra partum period was statistically significant

II Vs I.P.	P < .001
Similarly IP Vs PP 1 ST d	P < .001
IP Vs PP 7 TH d	P < .001
II Vs III	P < .05
III Vs I.P.	P > .05

LDL raised from a Basal value of 123.9 ± 14.94 during IInd trimester to 152.98 ± 22.50 during intra partum period . This difference was statistically significant

II Vs I.P.	p < .001
------------	----------

This LDL reached to values nearly equal to value at 2nd trimester on 30th post partum day

IP Vs PP 7 TH day	p < .05
IP Vs PP 30 th day	p < .05
II Vs III	p < .05.

HDL level was 34.8 ± 4.58 during IInd trimester , it declined to 32.0 ± 4.12 during labour and then again raised to 35.0 ± 3.36 on the 30th post partum day.

II Vs I.P.	p < 0.05
III Vs I.P.	p > .05

STG and VLDL showed a peak during labour from their values at 2nd trimester of 97.2 ± 16 and 19.28 ± 3.3 to 110 ± 20.33 to 22.1 ± 3.89 respectively . This rise in STG and VLDL was significant statistically

II nd Vs IP	p < .05
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TABLE III
serum lipoprotein profile in cases of mild preeclampsia

	II trimester	III trimester	IP period	24 hrs PP	7th day PP	30th day PP
STC mg % mean \pm SD	188 ± 23.06	205.2 ± 35.98	214.33 ± 33.4	190 ± 30.98	182.4 ± 32.09	183.33 ± 30.55
STG mg % mean \pm SD	105.33 ± 13.6	117 ± 20.68	120.6 ± 21.35	107.33 ± 21.56	98.4 ± 22.71	96 ± 22.53
HDLmg % mean \pm SD	36.3 ± 2.3	35.2 ± 3.2	33.8 ± 4.42	36.5 ± 3.8	37.4 ± 2.82	36.8 ± 2.4
LDL mg % mean \pm SD	129.33 ± 22.33	146.6 ± 27.16	155.8 ± 27.11	131.83 ± 23.09	125.4 ± 25.37	122 ± 25.15
VLDL mg % mean \pm SD	21 ± 2.64	23.2 ± 4.19	24.12 ± 4.28	21.5 ± 5.68	19.68 ± 4.95	19.2 ± 4.85
no of Cases	3	5	6	5	5	3

Table III shows that STC raised from a mean of 188 ± 23.06 to 214.33 ± 33.4 during labour and then came down to 182.4 ± 32.09 at 7th P.P. day. The fall in STC from I.P. period to 7th P.P. day was statistically significant

II Vs IP	p < .05
IP Vs PP 1 st day	p < .05
IP Vs PP 7 th day	p < .05
IP Vs PP 30 th day	p < .05

LDL raised from its value at 2nd trimester of 129.33 ± 22.36 to 155.8 ± 27.11 during labour and came down to 125.4 ± 25.37 on 7th P.P. day. This was statistically significant

II Vs I.P.	P < .05
I.P. Vs 1 st PP	
I.P. Vs 7 th PP	
I.P. Vs 30 th day PP	

HDL declined from 36.3 ± 2.3 at 2nd trimester to a value of 33.8 mg % and then raised again. mean STG was 105.33 ± 13.61 at 2nd trimester reached a peak to 120.6 ± 21.35 mg % term and then started falling reaching to 96 mg % at 30th post partum day. Similar trend was followed by VLDL also.

Table IV
serum lipoprotein profile in cases of severe preeclampsia

	II trimester	III trimester	IP period	24 hrs PP	7th day PP	30th day PP
STC mg % mean \pm SD	163 ± 4.24	183.5 ± 18.35	198.5 ± 21.18	173 ± 18.87	164 ± 17.8	140 ± 0
STG mg % mean \pm SD	83 ± 9.89	95.33 ± 12.96	101.33 ± 15.16	90 ± 15.09	84.66 ± 9.16	70 ± 0
HDL mg % mean \pm SD	32 ± 1.41	31.5 ± 5.74	30 ± 4.43	33 ± 3.65	34 ± 1.63	30 ± 0
LDL mg % mean \pm SD	115.4 ± 8.2	132.57 ± 10.19	146.25 ± 13.52	122.54 ± 16.58	113 ± 14.62	96 ± 0
VLDL mg % mean \pm SD	16.6 ± 1.97	19.06 ± 2.95	20.2 ± 3.17	16 ± 2.64	16.9 ± 1.83	14 ± 0
no of Cases	2	4	4	4	4	1

Table IV shows that STC raised markedly from IInd trimester to IIIrd trimester and from IIIrd trimester to intra partum period. its value was 163 ± 4.24 at 2nd trimester and 198.5 ± 21.18 mg % during labour. The fall was maximum at the 30th PP day when it was 140 mg %. Similarly LDL raised from 115 ± 8.2 at 2nd trimester to 146.25 ± 13.52 during labour and declined there after reaching to 113 ± 14.62 at 7th P.P. day and 96 mg % on 30th P.P. day. STG raised from 83 ± 9.89 at 2nd trimester to a peak during labour of

101.33 ± 15.16 mg and then declined thereafter. Interestingly HDL decreased very less from 32 ± 1.41 mg % at 2nd trimester to 30.0 ± 4.43 during labour.

For STC	II Vs III	$p < .05$
	II Vs I.P.	$p < .001$
	IP VS 7 th PP	$p < .001$
	IP Vs 30 th PP	$p < .001$
For LDL	II Vs III	$p < .05$
	II Vs IP	$p < .001$
	I.P. Vs 1 st PP	$p < .001$
	I.P. Vs 7 th PP	$p < .001$
	I.P. Vs 30 th	$P < .001$

TABLE V
Serum Lipoprotein Profile in Pre-eclampsia cases with low Birth Weight babies

	II trimester	III trimester	IP period	24 hrs PP	7th day PP	30th day PP
STC mg%	$190 \pm$	$195.33 \pm$	$205 \pm$	$180.66 \pm$	$172 \pm$	$190 \pm$
mean \pm SD	33.94	30.09	26.56	25.44	24.33	0
STG mg%	$103 \pm$	$101.33 \pm$	$108.0 \pm$	$98.33 \pm$	$90.66 \pm$	$108 \pm$
mean \pm SD	18.33	14.23	17.43	18.43	18.58	0
HDLmg%	$37 \pm$	$33.3 \pm$	32 ± 4	$35.33 \pm$	$36.0 \pm$	$36 \pm$
mean \pm SD	7.07	4.58		3.08	2.82	0
LDLmg%	$132.5 \pm$	$141.66 \pm$	$151.6 \pm$	$126.66 \pm$	$114.0 \pm$	$126 \pm$
mean \pm SD	22.62	23.68	19.46	19.35	17.69	0
VLDL	$20.6 \pm$	$20.3 \pm$	$21.6 \pm$	19.7 ± 3.9	$18.13 \pm$	$21.6 \pm$
mg%	9.8	4.2	3.5		3.9	0
no of case	2	3	3	3	3	1

Table V shows that STC raised from 190 ± 33.94 mg at 2nd trimester to 205 ± 26.56 during labour and then declined to 172 ± 24.3 mg % at 7th PP day. This rise statistically significant.

II Vs IP $p < .05$
 IP Vs 7th PP day $p < .001$
 IP Vs 1st PP day $p < .05$

LDL raised from 132.5 ± 22.62 mg % at 2nd trimester to 141.66 ± 23.68 at 3rd trimester, reaching a peak at labour of 151.6 ± 19.46 then declined to 126.41 ± 19.35 at 1st P.P. day and 114.0 ± 17.69 at 7th PP day.

II Vs IP $p < .05$
 IP Vs 1st PP day $p < .05$

IP Vs 7th PP day p < .05IP Vs 30th PP day p < .05

HDL decreased from 37.0 ± 7.07 at 2nd trimester to 32 ± 4 at labour. This fall was statistically significant

II Vs IP < .05

STG and VLDL showed a very small rise in their value maximum during labour.

Table VI
Lipoprotein profile regarding parity in subjects with pre-eclampsia

	Parity	II trimester	III trimester	IP period	24 hrs PP	7th day PP	30th day PP
STC mg % mean \pm SD	Primi	180 ± 29.59	201.66 ± 36.2	215 ± 36.09	188.33 ± 33.09	180 ± 31.78	180 ± 36.05
	Multi	175 ± 7.07	183.33 ± 3.08	200 ± 9.38	194.5 ± 27.1	162.0 ± 7.21	150 ± 0
LDL mg % mean \pm SD	Primi	$126. \pm 66$ 15.95	130.5 ± 34.46	156.66 ± 28.06	131.83 ± 38.03	125.0 ± 25.13	122.0 ± 25.17
	Multi	120 ± 36	131 ± 2.54	144.2 ± 8.22	122.25 ± 11.4	111.66 ± 8.09	96 ± 0
HDL mg % mean \pm SD	Primi	35 ± 6.44	34.5 ± 6.40	33.50 ± 4.89	35.33 ± 4.97	35.3 ± 3.22	34.66 ± 4.12
	Multi	35 ± 1.41	32.3 ± 2.12	31.0 ± 1.52	33.5 ± 3.51	35 ± 1.73	35 ± 0
no of Cases	Primi	3	6	6	6	6	3
	Multi	2	3	4	4	3	1

This shows that STC and LDL values were higher in Primi Gravidae in comparison to Multi Gravidae in the corresponding period of pregnancy during labour and in post partum period. This difference was however statistically not significant. At 30th PP day STC and LDL was 180 ± 36.05 and 122 ± 25.17 mg %. In primigravidae and 150 mg % and 96 mg % in multi gravidae. There was not much difference in HDL values in both subgroups. Except during labour it was high in primigravidae.

Multiple BAR diagram showing changes in various lipid fraction during pregnancy and labour in patients with preeclampsia

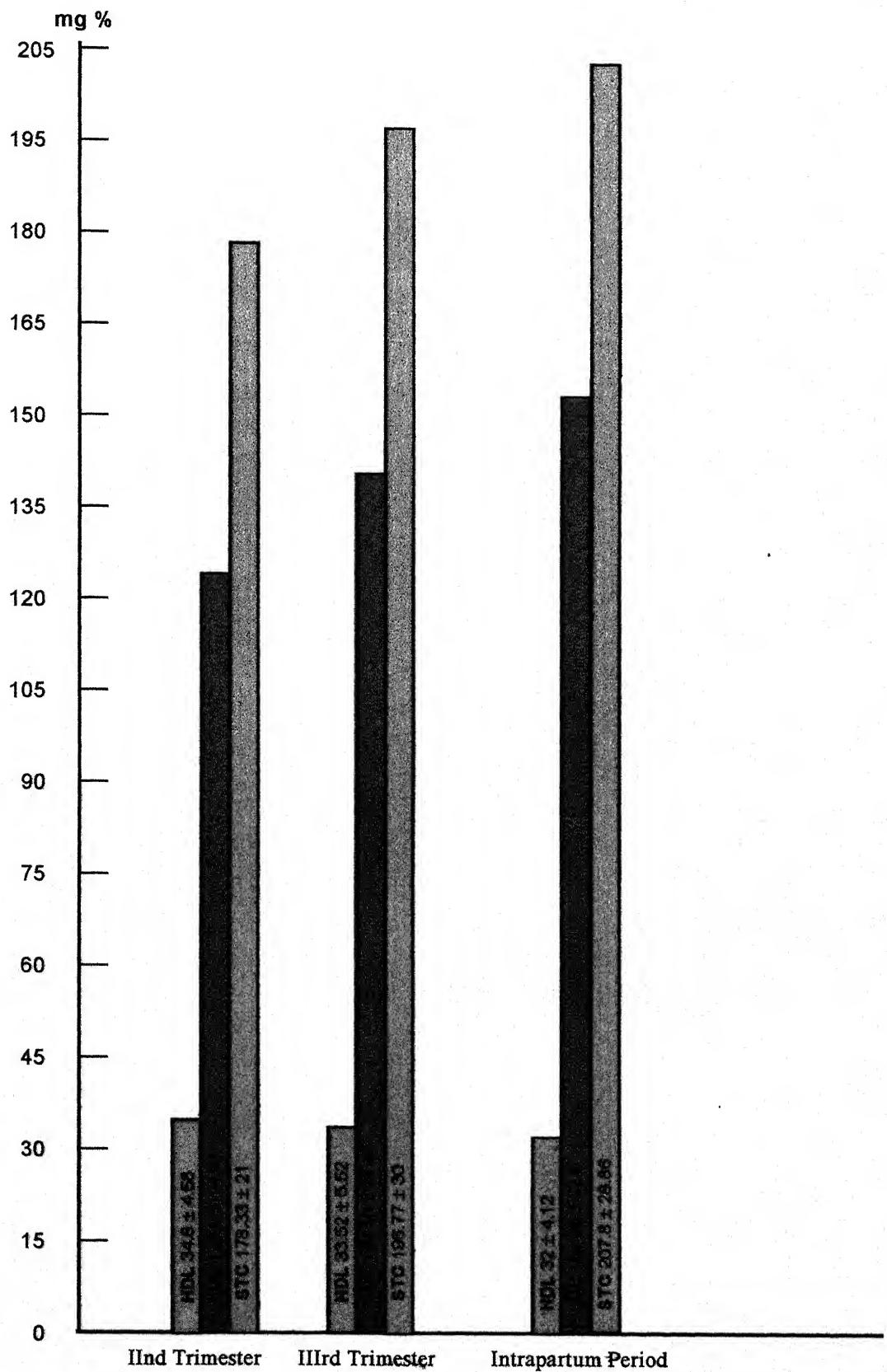


TABLE VII
Serum Lipoprotein profile in cases of eclampsia during
Antepartum, Intrapartum & post partum period

	IIInd trimester	IIIrd trimester	IP period	1st post partum day	7th post partum day	30th post partum day
STC mg % Mean \pm SD	---	219.37 \pm 36.3	234.41 \pm 40.17	209.75 \pm 31.2	199.75 \pm 28.6	180.83 \pm 24.5
STG mg % Mean \pm SD	---	111.75 \pm 24.79	114.82 \pm 26.46	103.56 \pm 21.49	97.87 \pm 19.7	85.5 \pm 18.02
HDL mg % Mean \pm SD	---	32.4 \pm 3.96	29 \pm 4.47	30.1 \pm 5.4	28.25 \pm 6.51	29.6 \pm 3.88
LDL mg % mean \pm SD	---	156.88 \pm 29.96	178.82 \pm 32.03	157.37 \pm 20.87	148 \pm 25.69	131 \pm 16.27
VLDL mg % mean \pm SD	---	22.35 \pm 5.12	23 \pm 5.38	22.25 \pm 4.40	19.5 \pm 3.94	17 \pm 3.94
no of cases (n)	---	17	17	16	16	6

Table VII shows that STC raised from 219.37 ± 36.3 mg at 3rd trimester to 234.41 ± 40.17 mg % at term and then declined to 209.75 ± 31.2 at 1st P.P. day, 199.75 ± 28.6 at 7th P.P. day and 180.83 ± 24.5 mg % at 30th P.P. day. Rise from IIIrd trimester to I.P. period was statistically insignificant.

III Vs I.P.	p < .001
IP Vs 1st PP day	p < .001
IP Vs 7th PP day	p < .001
IP Vs 30th PP day	p < .001

LDL raised from 156.88 ± 29.96 mg % at 3rd trimester to 178.82 ± 32 during labour which declined to 157.37 ± 20.87 at 1st Pp day and 131 ± 16.27 at 30th PP day.

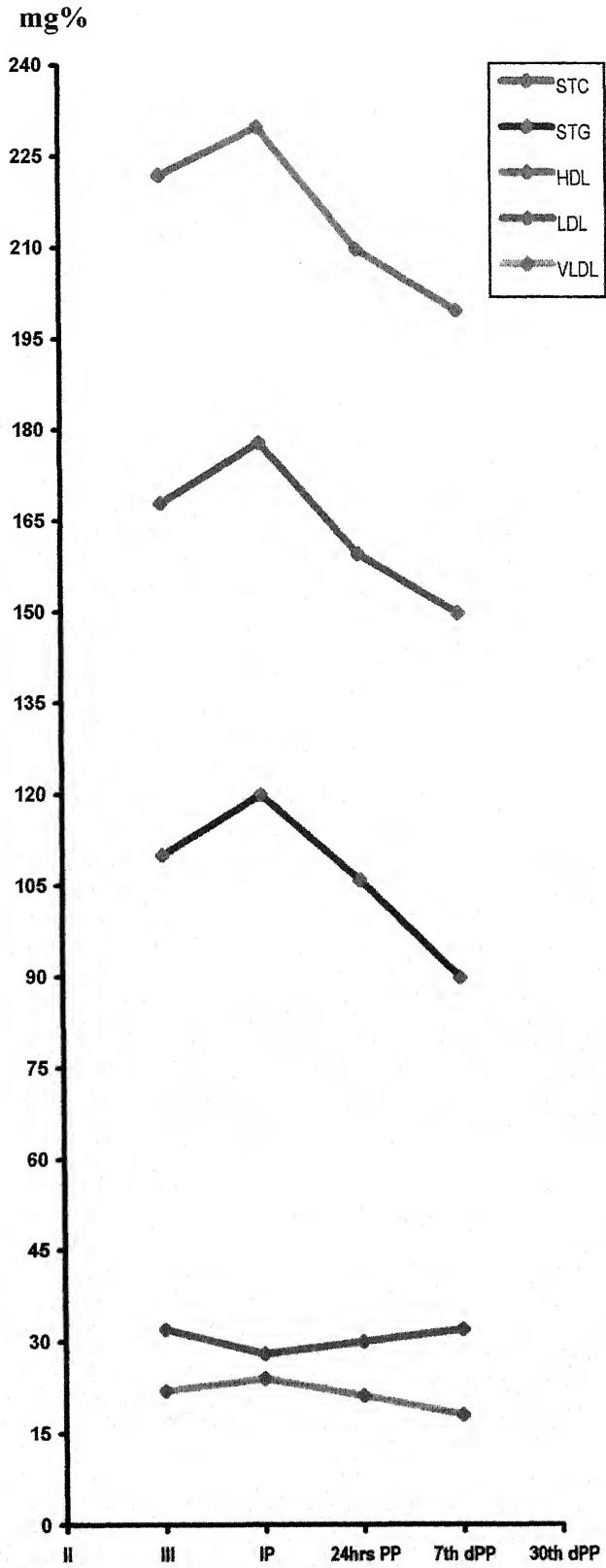
III Vs IP	p < .001
IP Vs 1st PP day	p < .001
IP Vs 7th PP day	p < .001
IP Vs 30th PP day	p < .001

HDL value was 32.41 ± 3.96 at 3rd trimester which declined to 29 ± 4.47 during labour then raised to 30.1 ± 5.4 on 1st P.P. day, again raised to 28.25 ± 6.51 on 7th PP day.

III Vs IP	p < .001

There was very slight rise in STG & VLDL upto labour from 3rd trimester.

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Case no 1

*Patient - Rajni
23yrs*

- * *Primi Gravida*
- * *Middle Socioeconomic Status*
- * *Non Vegetarian*
- * *C/o Convulsions for one day*
- * *Paedal oedema present*
- * *BP 160/110 mm Hg*
- * *Obstetrical & other systemic examination NAD*
- * *Urine - Albumin present*
- * *LFT & RFT Normal*
- * *Out come \Rightarrow Premature Vaginal delivery female baby*

wt. 2.4 kg.

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	-	222	230	210	200	-
STG	-	110	120	106	90	-
HDL	-	32	26	30	32	-
LDL	-	168	178	159.8	150	-
VLDL	-	22	24	21.2	18	-

STC 1mmol/L = 38.76mg%

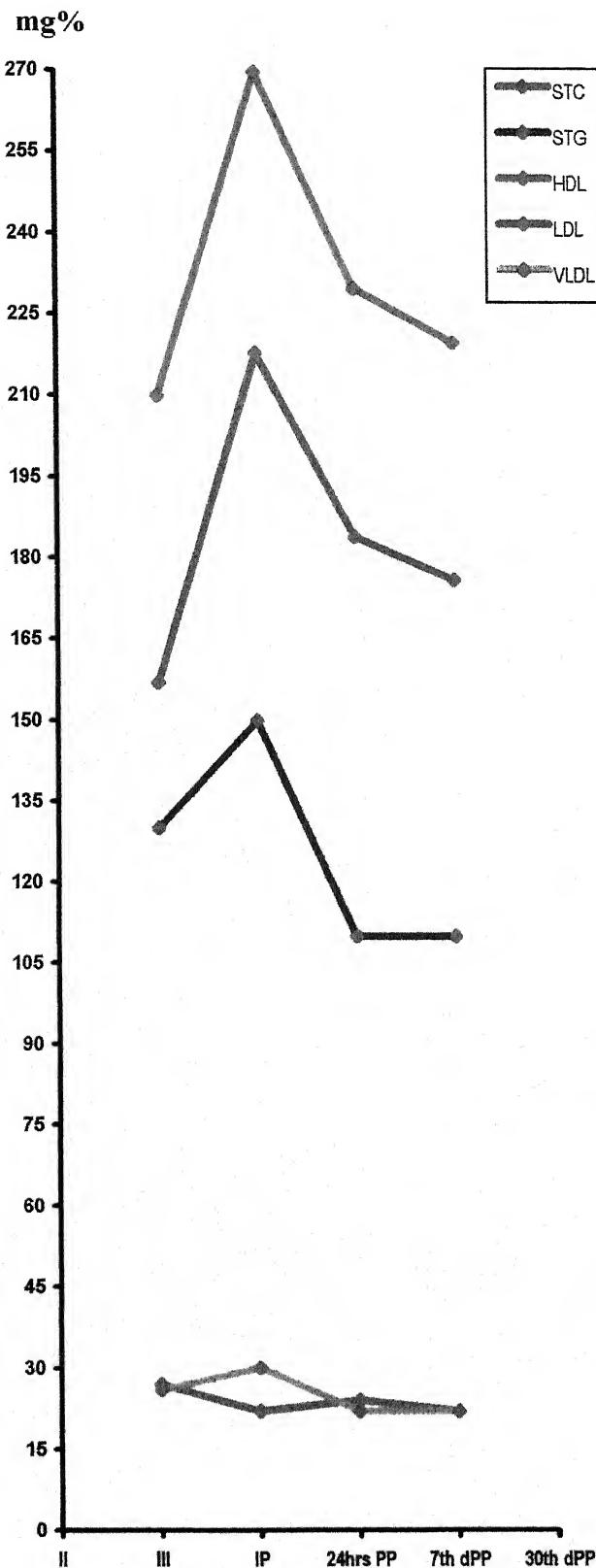
STG mmol/L = mg% $\times 0.0114$

HDL mmol/L = mg% / 38.76

Legend :

- * *5% \uparrow in STC, maximum value during labour*
- * *9% \downarrow in STC, with in 24hrs PP*
- * *8% \uparrow in LDL, maximum value during labour*
- * *12% \downarrow in LDL, with in 24hrs PP*
- * *12% \downarrow in HDL, up to labour*

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Case no 2

*Patient - Guddi
26yrs*

- * *G3P2L2*
- * *Lower Socioeconomic Status*
- * *Vegetarian*
- * *Unconscious during admission*
- * *BP 150/100 mm Hg*
- * *Obstetrical & other systemic examination NAD*
- * *Urine - Albumin present*
- * *LFT Normal & RFT Impaired*
- * *Outcome \Rightarrow Spontaneous expulsion of male dead foetus*

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	-	210	270	230	220	-
STG	-	130	150	110	110	-
HDL	-	27	22	24	22	-
LDL	-	157	218	184	176	-
VLDL	-	26	30	22	22	-

STC Immol/L = 38.76mg%

STG mmol/L = mg% $\times 0.0114$

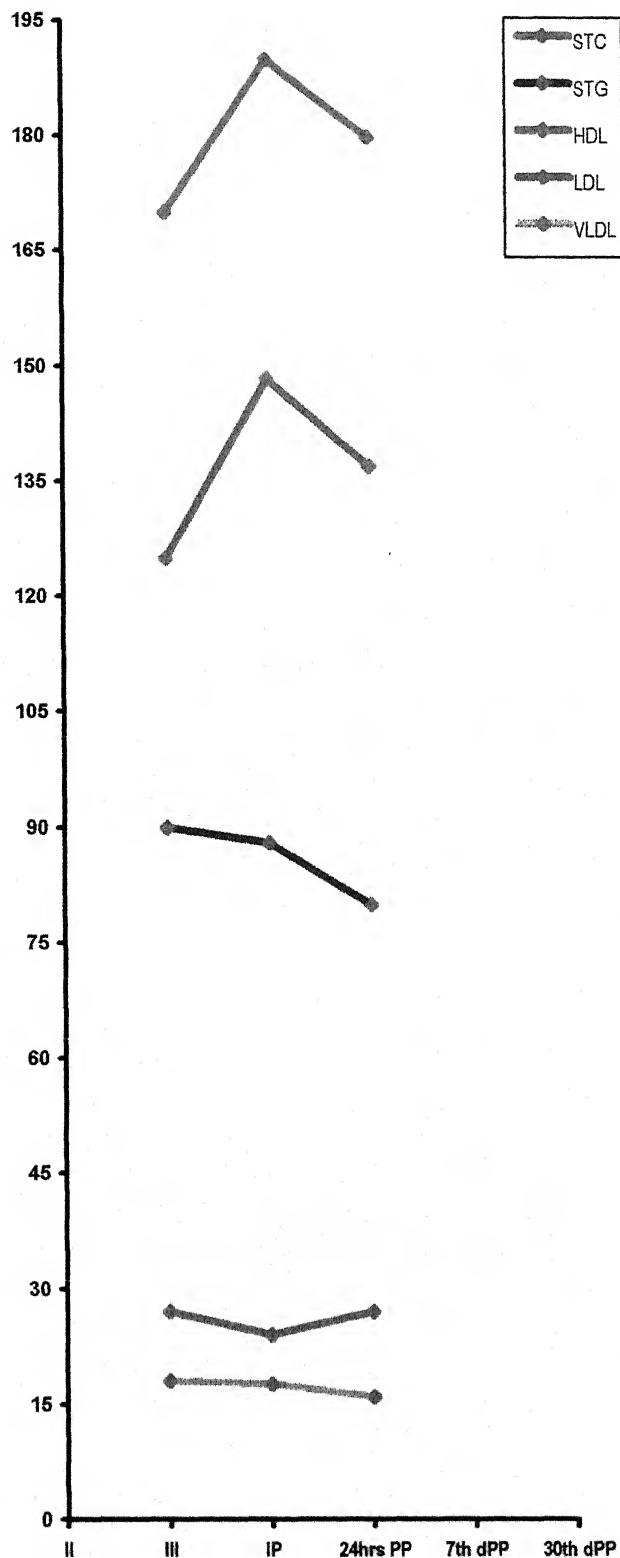
HDL mmol/L = mg% / 38.76

Legend :

- * *29% \uparrow in STC, maximum value during labour*
- * *15% \downarrow in STC, with in 24hrs PP*
- * *35% \uparrow in LDL, maximum value during labour*
- * *14% \downarrow in LDL, with in 24hrs PP*
- * *19% \downarrow in HDL, up to labour*

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mg%



Case no 3

Patient - Meena
25 yrs

- * *Primi Gravida*
- * *Upper Socioeconomic Status*
- * *Non Vegetarian*
- * *C/o Convulsions for one day*
- * *Paedal oedema present*
- * *BP 170/100 mm Hg*
- * *Urine - Protein present*
- * *LFT Normal & RFT Impaired*
- * *Developed renal failure*
- * *Out come \Rightarrow F.T.N.D, male baby wt. 2.8 kg*

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	-	170	190	180	-	-
STG	-	90	88	80	-	-
HDL	-	27	24	27	-	-
LDL	-	125	148.4	137	-	-
VLDL	-	18	17.6	16	-	-

STC 1mmol/L = 38.76mg%

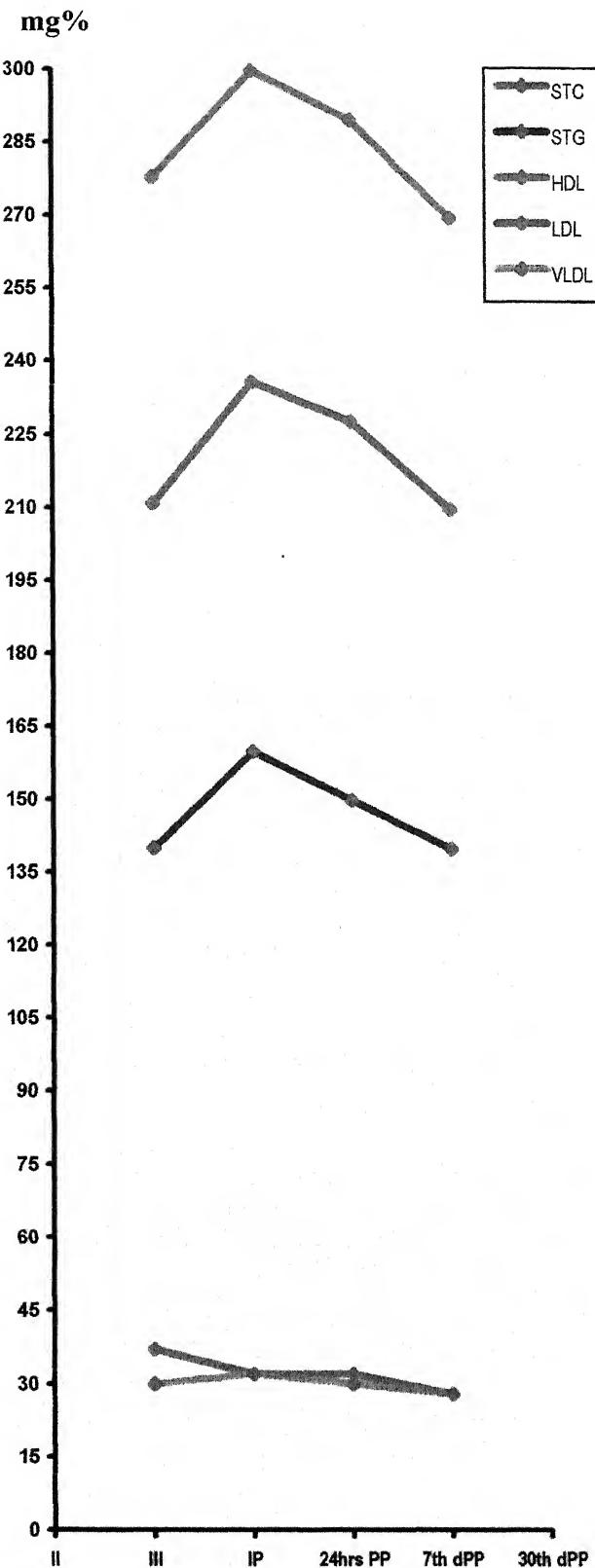
STG mmol/L = mg% $\times 0.0114$

HDL mmol/L = mg% / 38.76

Legend :

- * 12% \uparrow in STC, maximum value during labour
- * 6% \downarrow in STC, with in 24hrs PP
- * 20% \uparrow in LDL, maximum value during labour
- * 7% \downarrow in LDL, with in 24hrs PP
- * 11% \downarrow in HDL, up to labour

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Case no 4

Patient - Hemwati
22 yrs

- * *Primi Gravida*
- * *Middle Socioeconomic Status*
- * *Vegetarian*
- * *Unconscious during admission*
- * *Paedal oedema present*
- * *BP 140/96 mm Hg*
- * *Urine - Protein present*
- * *LFT Impaired & RFT Normal*
- * *Outcome \Rightarrow Spontaneous expulsion of premature male dead baby*

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	-	278	300	290	270	-
STG	-	150	160	150	140	-
HDL	-	37	32	32	28	-
LDL	-	211	236	228	210	-
VLDL	-	30	32	30	28	-

STC $1\text{ mmol/L} = 38.76\text{ mg\%}$

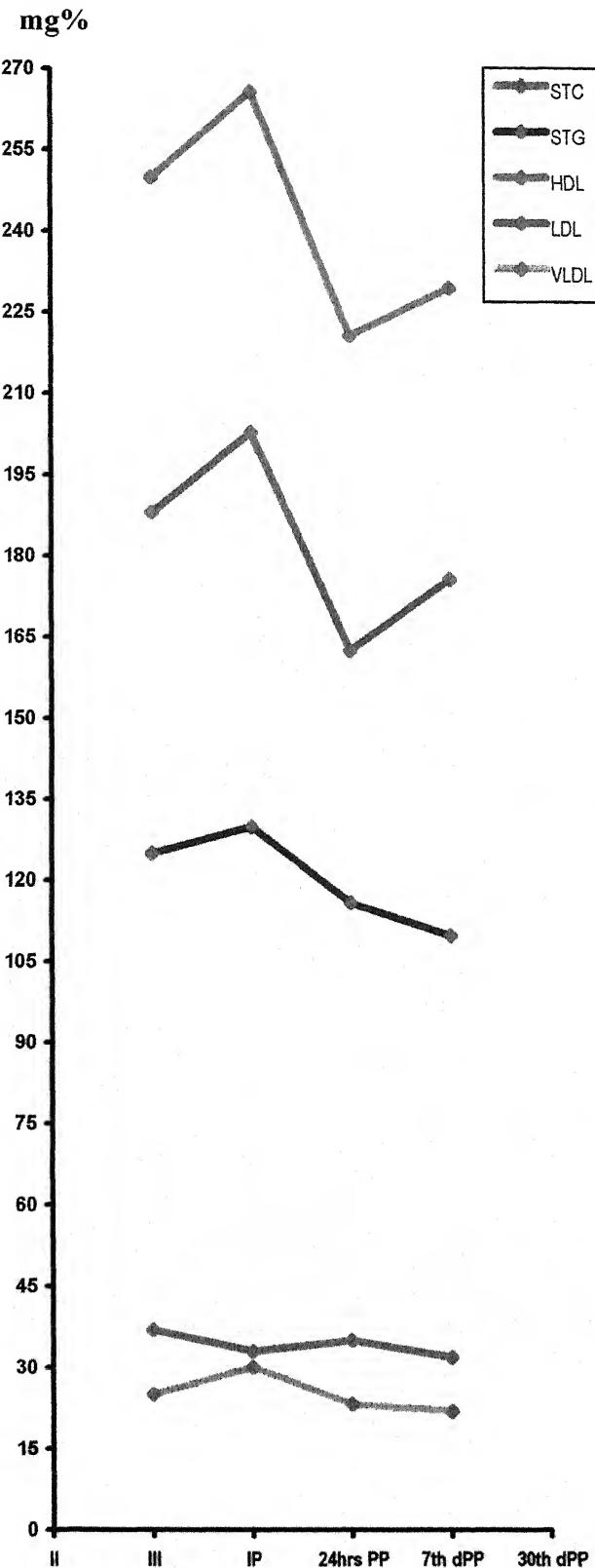
STG $\text{mmol/L} = \text{mg\%} \times 0.0114$

HDL $\text{mmol/L} = \text{mg\%} / 38.76$

Legend :

- * 8% \uparrow in STC, maximum value during labour
- * 3% \downarrow in STC, with in 24hrs PP
- * 12% \uparrow in LDL, maximum value during labour
- * 3% \downarrow in LDL, with in 24hrs PP
- * 13% \downarrow in HDL, up to labour

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Case no 5

Patient - *Kashi bai*
25yrs

- * *G1P1L1*
- * Lower Socioeconomic Status
- * Vegetarian
- * *Unconscious during admission*
- * *Paedal oedema present*
- * *BP 140/110 mm Hg*
- * *Urine - Protein present*
- * *LFT & RFT Normal*
- * *Out come⇒ F.T.N.D, female baby wt 2.7 kg*

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	-	250	266	221	230	-
STG	-	125	130	116	110	-
HDL	-	37	33	35	32	-
LDL	-	188	203	162.8	176	-
VLDL	-	25	30	23.2	22	-

STC 1mmol/L = 38.76mg%

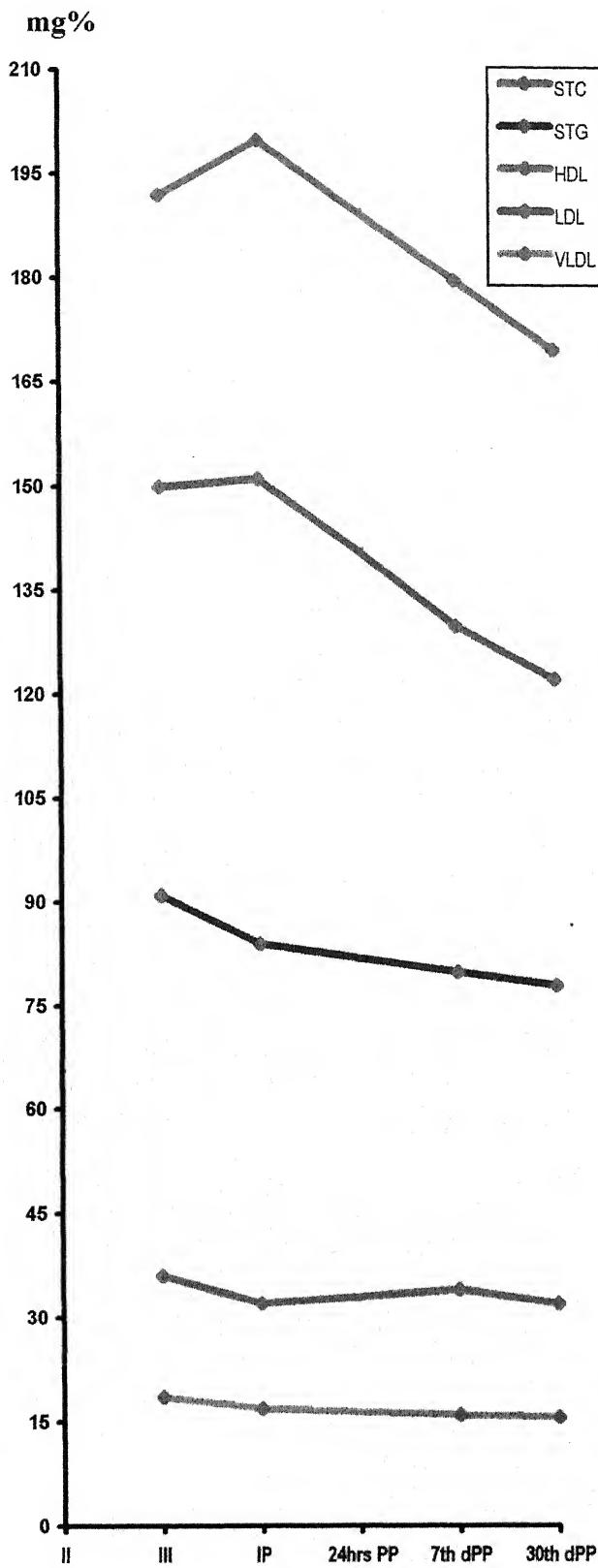
STG mmol/L = mg% × 0.0114

HDL mmol/L = mg% / 38.76

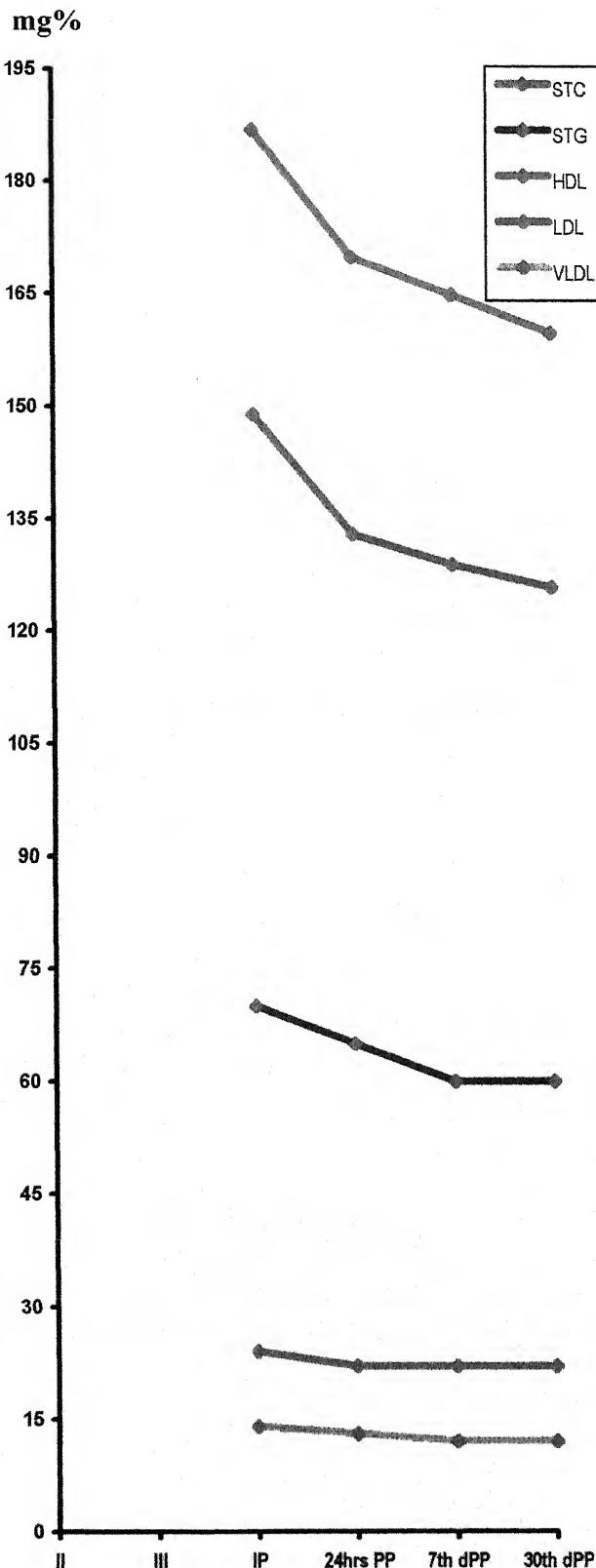
Legend :

- * 7% ↑ in STC, maximum value during labour
- * 17% ↓ in STC, with in 24hrs PP
- * 9% ↑ in LDL, maximum value during labour
- * 20% ↓ in LDL, with in 24hrs PP
- * 11% ↓ in HDL, up to labour

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Case no 7

Patient - Mala

23 yrs

- * *Primi Gravida*
- * *Middle Socioeconomic Status*
- * *Vegetarian*
- * *C/o Swelling over feet & convulsions*
- * *Paedal oedema present*
- * *BP 160/110 mm Hg*
- * *Urine - Protein present*
- * *LFT & RFT Normal*
- * *Out come \Rightarrow F.T.N.D, female baby wt 2.4 kg*

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	-	-		187	170	165
STG	-	-		70	65	60
HDL	-	-		24	22	22
LDL	-	-		149	133	129
VLDL	-	-		14	13	12

STC 1mmol/L = 38.76mg%

STG mmol/L = mg% $\times 0.0114$

HDL mmol/L = mg% / 38.76

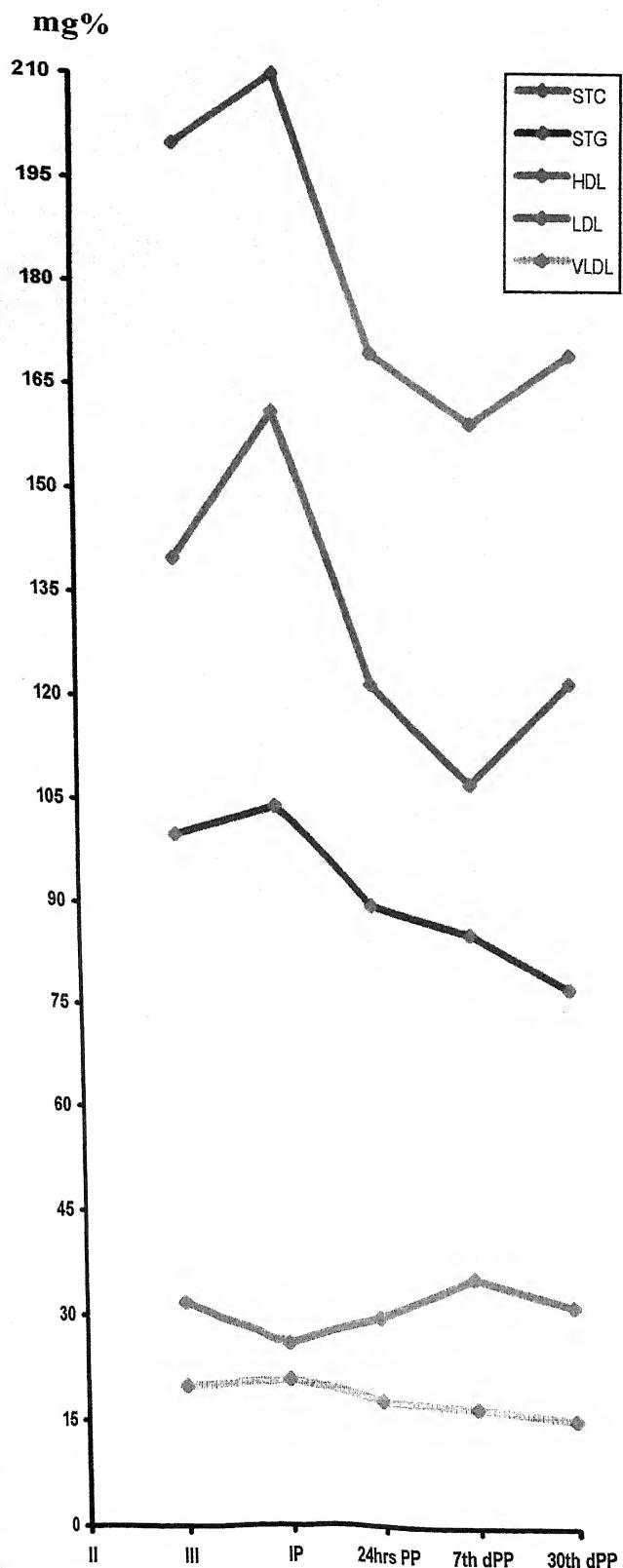
Legend :

* *9% ↓ in STC, with in 24hrs PP*

* *15% ↓ in LDL, with in 24hrs PP*

* *10% ↓ in HDL, up to labour*

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Case no 8

*Patient - Geeta
18yrs*

- * *Primi Gravida*
- * *Middle Socioeconomic Status*
- * *Vegetarian*
- * ***C/o Convulsions for 2 days & Blurring of Vision***
- * ***BP 140/100 mm Hg***
- * ***Urine - Protein present***
- * ***LFT & RFT Normal***
- * ***Out come⇒ Forceps delivery of female baby by Vertex, wt 2.8 kg***

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	-	200	210	170	160	-
STG	-	100	104	90	86	-
HDL	-	32	26	30	36	-
LDL	-	148	161.8	122	107.8	-
VLDL	-	20	20.8	18	17.2	-

STC 1 mmol/L = 38.76 mg%

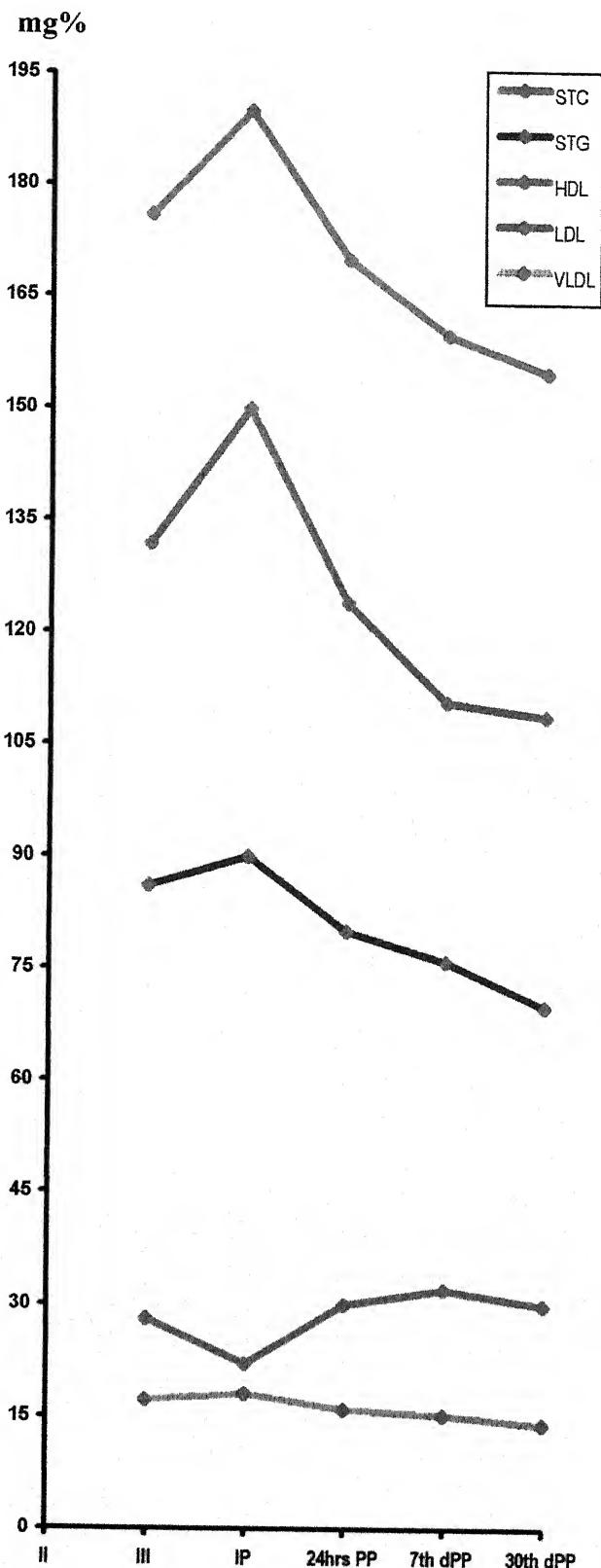
STG mmol/L = mg% × 0.0114

HDL mmol/L = mg% / 38.76

Legend :

- * ***5% ↑ in STC, maximum value during labour***
- * ***20% ↓ in STC, with in 24hrs PP***
- * ***9% ↑ in LDL, maximum value during labour***
- * ***21% ↓ in LDL, with in 24hrs PP***
- * ***18% ↓ in HDL, up to labour***

ECLAMPSIA GROUP



Case no 9

*Patient - Rajkumari
25yrs*

- * *G2P1L1*
- * *Middle Socioeconomic Status*
- * *Non Vegetarian*
- * *C/o Convulsions for one day*
- * *Paedal oedema present*
- * *BP 160/120 mm Hg*
- * *Urine - Protein present*
- * *LFT & RFT Normal*
- * *Out come \Rightarrow premature Vaginal delivery female baby, wt 2.0 kg*

Values mg%

	II	III	IP	24hrs period PP	7th dPP	30th dPP
STC	-	176	190	170	160	155
STG	-	86	90	80	76	70
HDL	-	28	22	30	32	30
LDL	-	131.8	150	124	110.8	101
VLDL	-	17.2	18	16	15.2	14

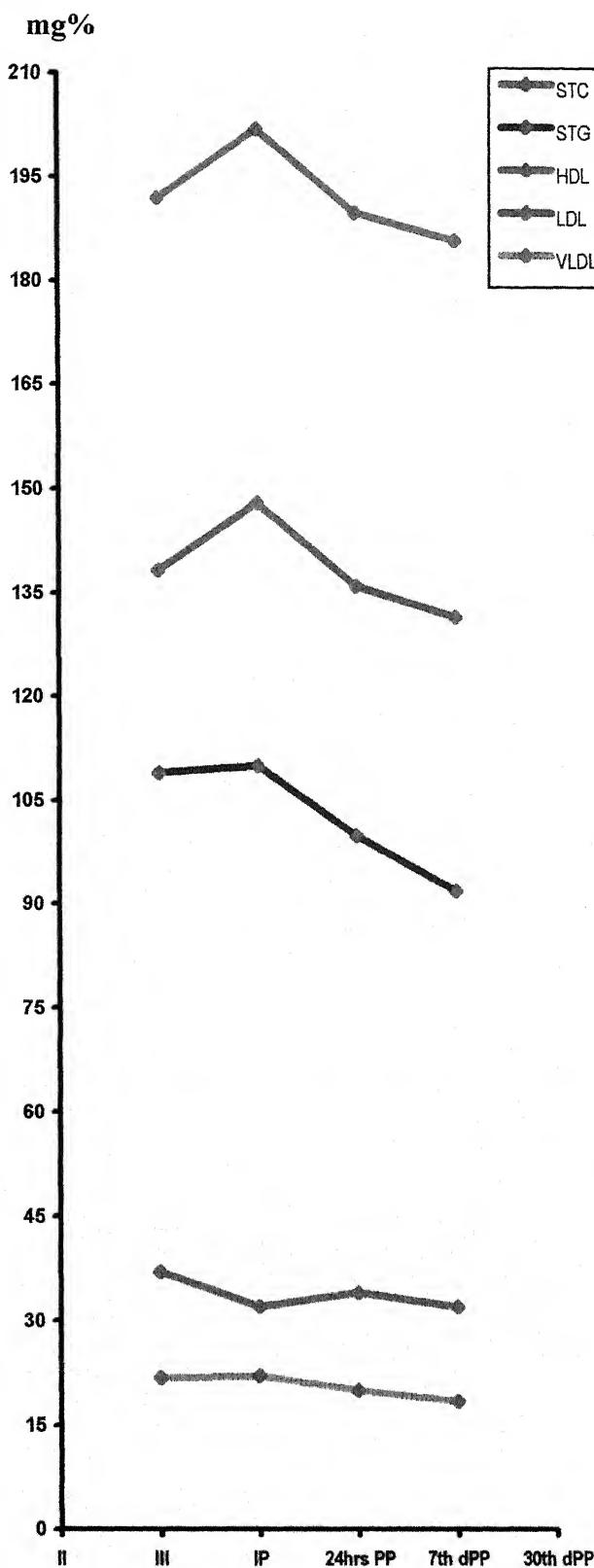
STC 1mmol/L = 38.76mg%

STG mmol/L = mg% \times 0.0114

HDL mmol/L = mg% / 38.76

Legend :

- * *8% \uparrow in STC, maximum value during labour*
- * *12% \downarrow in STC, with in 24hrs PP*
- * *17% \uparrow in LDL, maximum value during labour*
- * *18% \downarrow in LDL, with in 24hrs PP*
- * *27% \downarrow in HDL, up to labour*



ECLAMPSIA GROUP

Case no 10

*Patient - Susheela
26yrs*

- * *G3P3L3*
- * *Lower Socioeconomic Status*
- * *Vegetarian*
- * *C/o Swelling over feet & convulsions one day back*
- * *BP 190/100 mm Hg*
- * *Urine - Protein present*
- * *LFT & RFT Normal*
- * *Out come \Rightarrow F.T.N.D, female baby wt 2.8 kg*

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	-	192	202	190	186	-
STG	-	109	110	100	92	-
HDL	-	37	32	34	32	-
LDL	-	138.2	148	136	131.6	-
VLDL	-	21.8	22	20	18.4	-

STC 1mmol/L = 38.76mg%

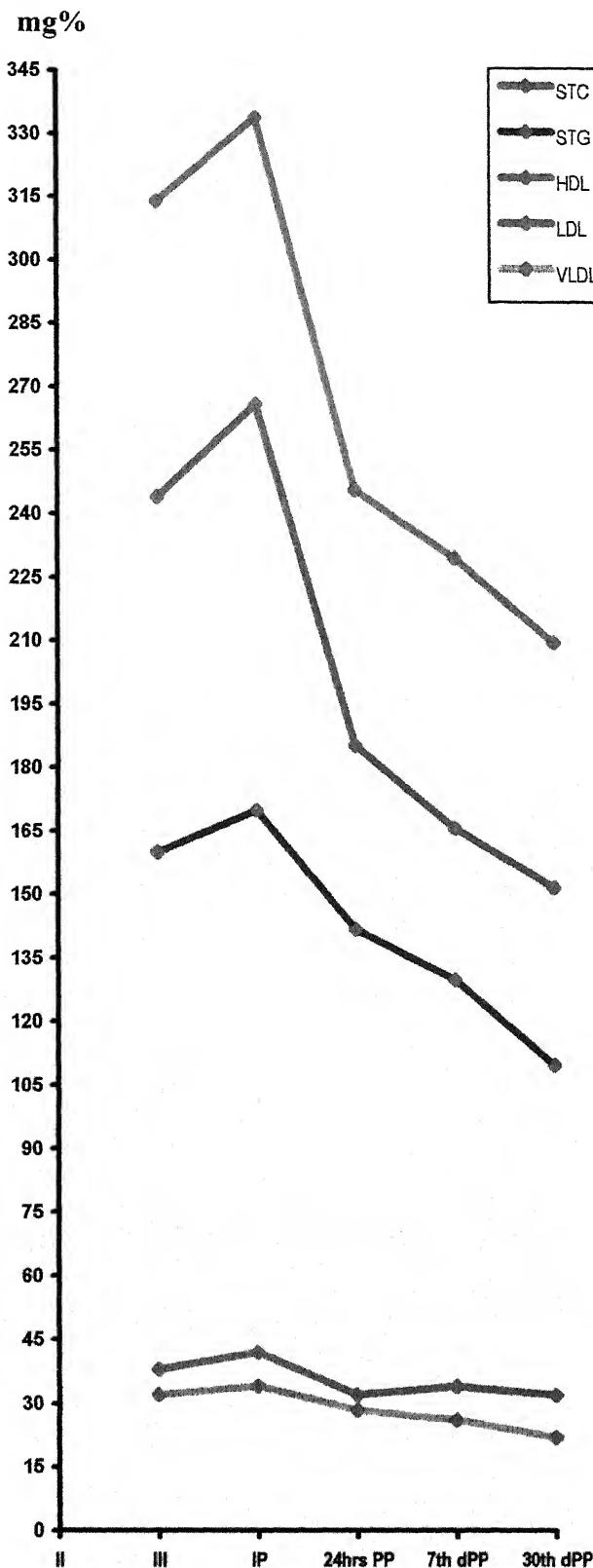
STG mmol/L = mg% \times 0.0114

HDL mmol/L = mg% / 38.76

Legend :

- * *6% \uparrow in STC, maximum value during labour*
- * *7% \downarrow in STC, with in 24hrs PP*
- * *8% \uparrow in LDL, maximum value during labour*
- * *9% \downarrow in LDL, with in 24hrs PP*
- * *11% \downarrow in HDL, up to labour*

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Case no 11

*Patient - Madhu
18yrs*

- * *Primi Gravida*
- * *Upper Socioeconomic Status*
- * *Non Vegetarian*
- * *C/o Unconscious during admission*
- * *Paedal oedema present*
- * *BP 160/110 mm Hg*
- * *Urine - Protein present*
- * *LFT Normal & RFT Impaired*
- * *Deveoloped renal failure*
- * *Out come \Rightarrow Spontanious expulsions of dead male baby*

Values mg%

	II	III	IP	24hrs PP	7th dPP	30th dPP
STC	-	314	334	246	230	210
STG	-	160	170	142	130	110
HDL	-	38	34	32	34	32
LDL	-	244	266	185.6	166	142
VLDL	-	32	34	28.4	26	22

STC Immol/L = 38.76mg%

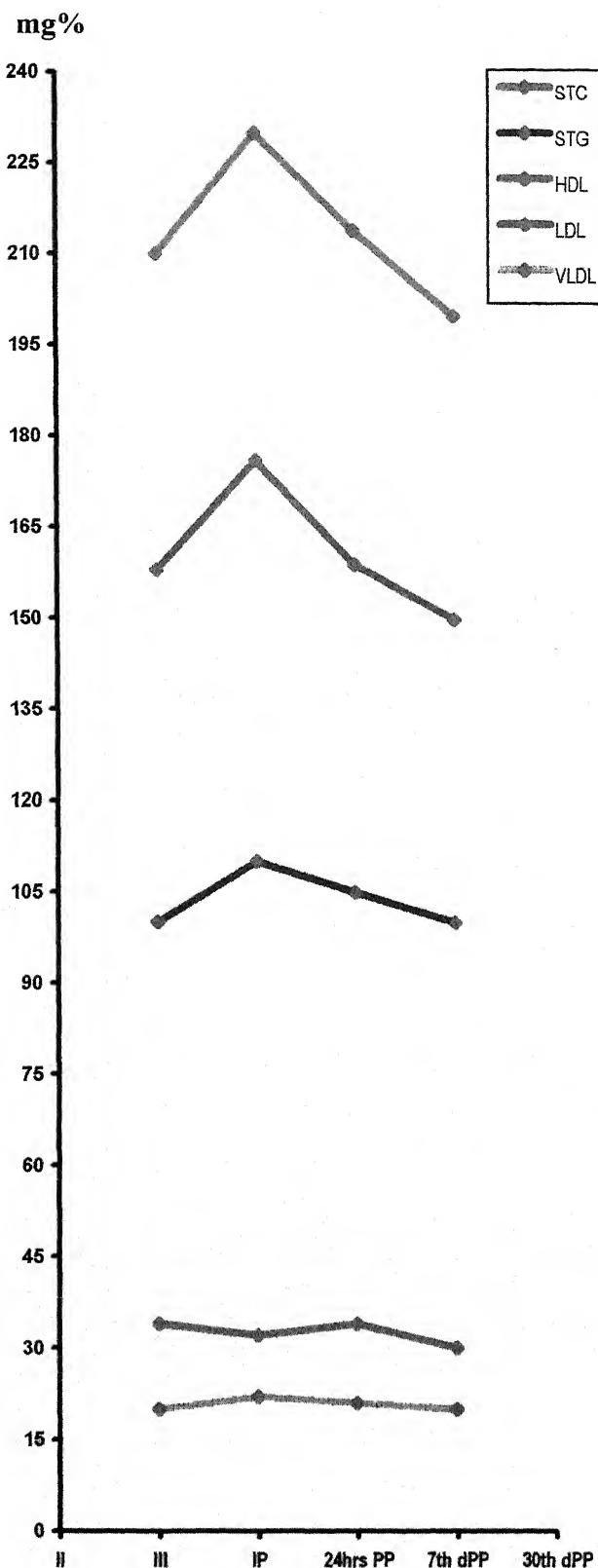
STG mmol/L = mg% $\times 0.0114$

HDL mmol/L = mg% / 38.76

Legend :

- * *8% \uparrow in STC , maximum value during labour*
- * *27% \downarrow in STC , with in 24hrs PP*
- * *7% \uparrow in LDL, maximum value during labour*
- * *30% \downarrow in LDL , with in 24hrs PP*
- * *10% \downarrow in HDL , up to labour*

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Case no 12

*Patient - Pawan Kumari
21yrs*

- * *Primi Gravida*
- * *lower Socioeconomic Status*
- * *Vegetarian*
- * *C/o Unconscious during admission*
- * *Paedal oedema present*
- * *BP 148/96 mm Hg*
- * *Urine - Protein present*
- * *LFT Normal & RFT Impaired*
- * *Deveolped renal failure*
- * *Out come⇒ F.T.N.D, female baby wt. 2.4 kg*

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	-	210	230	214	200	-
STG	-	100	110	105	100	-
HDL	-	34	32	34	30	-
LDL	-	158	176	159	150	-
VLDL	-	20	22	21	20	-

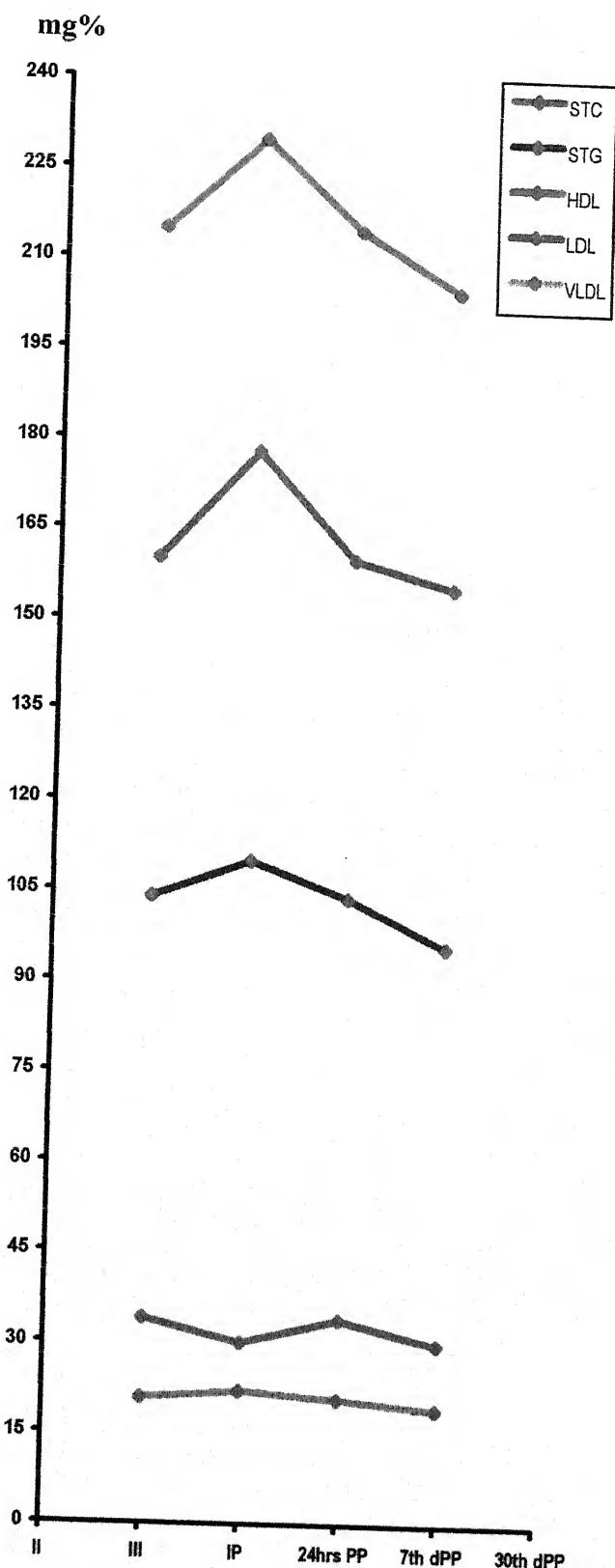
STC 1mmol/L = 38.76mg%

STG mmol/L = mg% × 0.0114

HDL mmol/L = mg% / 38.76

Legend :

- * *10% ↑ in STC, peak during labour*
- * *7% ↓ in STC, with in 24hrs PP*
- * *14% ↑ in LDL, peak during labour*
- * *10% ↓ in LDL, with in 24hrs PP*
- * *5% ↓ in HDL, up to labour*



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Case no 13

Patient - Raj kumari
26yrs

- * *G2P2L2*
- * *Lower Socioeconomic Status*
- * *Vegetarian*
- * *C/o Convulsions for one day*
- * *Paedal oedema present*
- * *BP 160/96 mm Hg*
- * *Urine - Protein present*
- * *LFT & RFT Normal*
- * *Out come \Rightarrow F.T.N.D, female baby wt 2.7 kg*

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	-	215	230	215	205	-
STG	-	104	110	104	96	-
HDL	-	34	30	34	30	-
LDL	-	160.2	178	160.2	147.8	-
VLDL	-	20.8	22	20.8	19.2	-

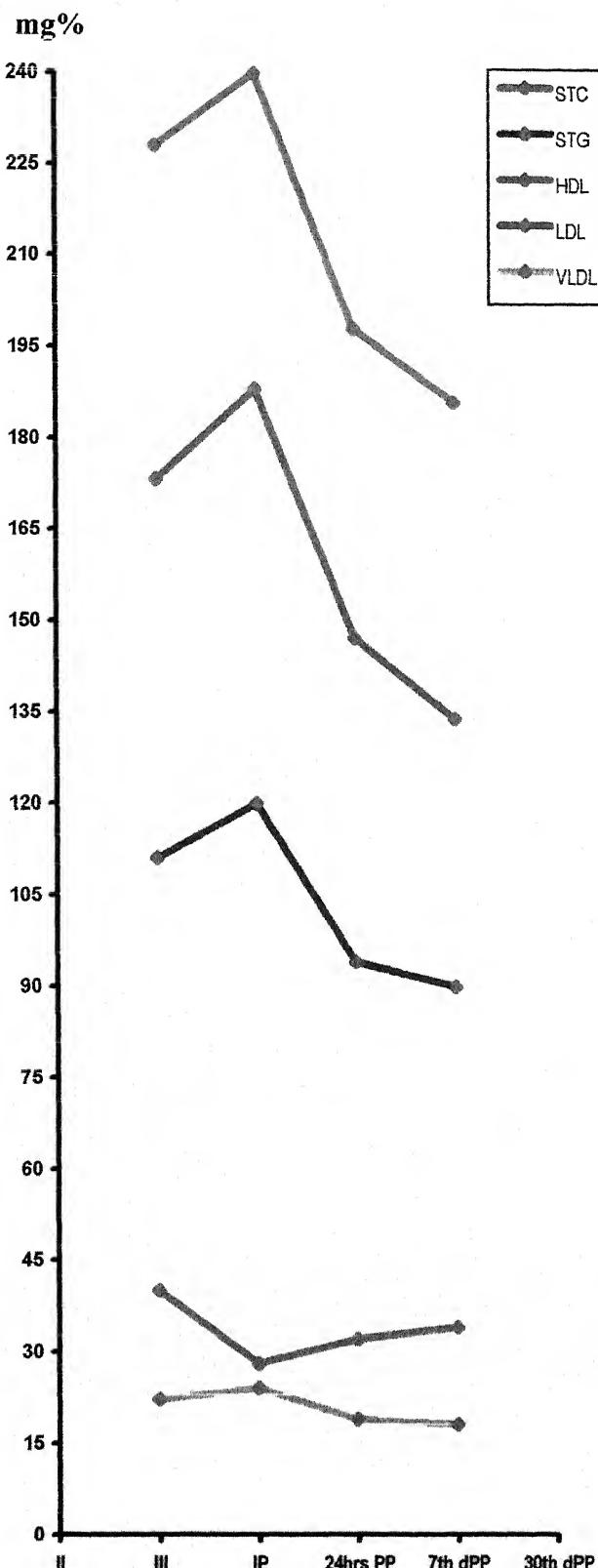
STC $1\text{ mmol/L} = 38.76\text{ mg\%}$

STG $\text{mmol/L} = \text{mg\%} \times 0.0114$

HDL $\text{mmol/L} = \text{mg\%} / 38.76$

Legend:

- * *7% \uparrow in STC, peak during labour*
- * *6% \downarrow in STC, with in 24hrs PP*
- * *12% \uparrow in LDL, peak during labour*
- * *12% \downarrow in LDL, with in 24hrs PP*
- * *11% \downarrow in HDL, up to labour*



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Case no 14

*Patient - Kunwar bai
20yrs*

- * *Primi Gravida*
- * *Lower Socioeconomic Status*
- * *Vegetarian*
- * *C/o Unconscious during admission*
- * *Paedal oedema present*
- * *BP 180/100 mm Hg*
- * *Urine - Protein present*
- * *LFT & RFT Normal*
- * *Out come \Rightarrow Forcep delivery of still female baby*

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	-	228	240	198	186	-
STG	-	111	120	94	90	-
HDL	-	32	28	32	34	-
LDL	-	173.2	188	147.2	134	-
VLDL	-	22.2	24	18.8	18	-

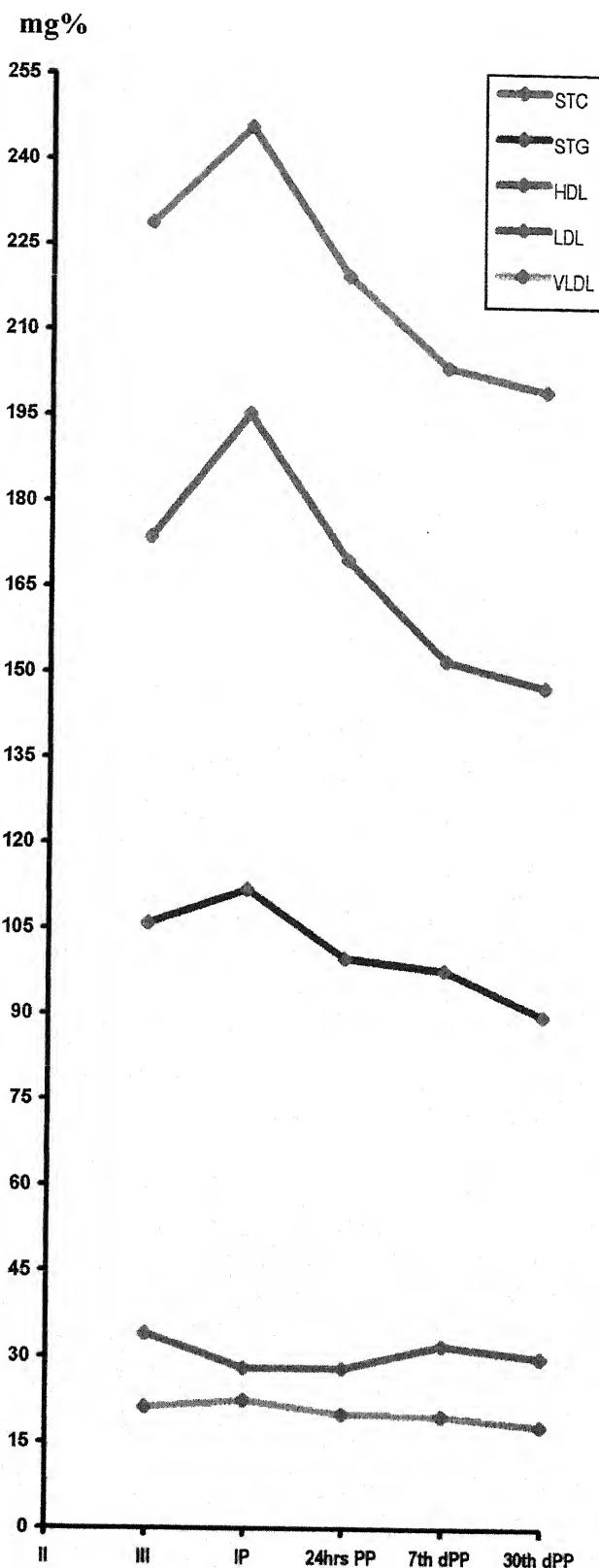
STC 1mmol/L = 38.76mg%

STG mmol/L = mg% $\times 0.0114$

HDL mmol/L = mg% / 38.76

Legend :

- * *7% \uparrow in STC, peak during labour*
- * *20% \downarrow in STC, with in 24hrs PP*
- * *9% \uparrow in LDL, peak during labour*
- * *22% \downarrow in LDL, with in 24hrs PP*
- * *12% \downarrow in HDL, up to labour*



ECLAMPSIA GROUP

Case no 15

Patient - Angoori
24yrs

- * *Primi Gravida*
- * *Lower Socioeconomic Status*
- * *Vegetarian*
- * *C/o Convulsions for one day*
- * *Oedema over feet present*
- * *BP 150/100 mm Hg*
- * *Urine - Protein present*
- * *LFT Impaired & RFT Normal*
- * *Outcome \Rightarrow Spontaneous expulsion of full term dead male foetus*

	Values mg%					
	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	-	229	246	220	204	200
STG	-	106	112	100	98	90
HDL	-	34	28	28	32	30
LDL	-	173.8	195.6	170	152.4	148
VLDL	-	21.2	22.4	20	19.6	18

STC 1mmol/L = 38.76 mg\%

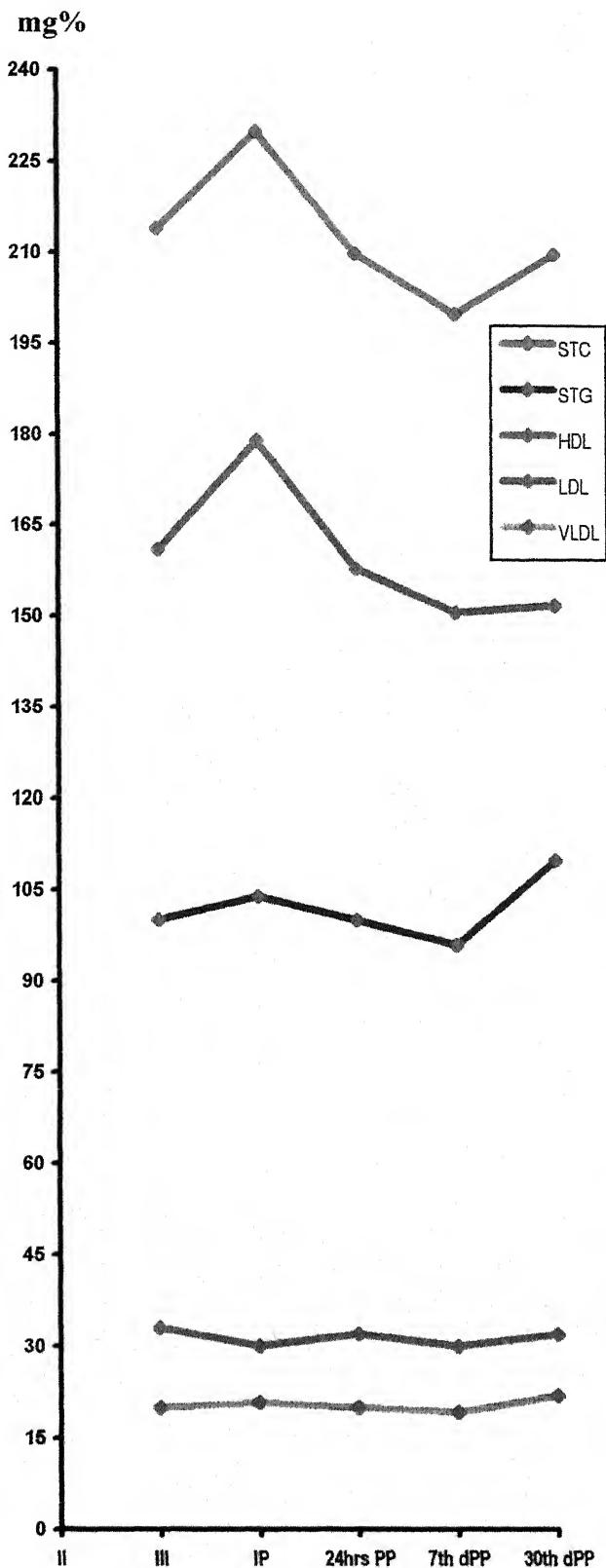
STG mmol/L = $\text{mg\%} \times 0.0114$

HDL mmol/L = $\text{mg\%} / 38.76$

Legend :

- * *8% \uparrow in STC, peak during labour*
- * *11% \downarrow in STC, with in 24hrs PP*
- * *12% \uparrow in LDL, peak during labour*
- * *14% \downarrow in LDL, with in 24hrs PP*
- * *17% \downarrow in HDL, up to labour*

ECLAMPSIA GROUP



Case no 16

*Patient - Jareena
21yrs*

- * *Primi Gravida*
- * *Lower Socioeconomic Status*
- * *Non Vegetarian*
- * *C/o Convulsions for six hrs*
- * *Paedal oedema absent*
- * *BP 140/100 mm Hg*
- * *Urine - Protein present*
- * *LFT Normal & RFT Impaired*
- * *Developed renal failure*
- * *Out come \Rightarrow F.T.N.D, female baby
wt. 2.6 kg*

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	-	214	230	210	200	-
STG	-	100	104	100	96	-
HDL	-	33	30	32	30	-
LDL	-	161	179	158	150.8	-
VLDL	-	20	20.8	20	19.2	-

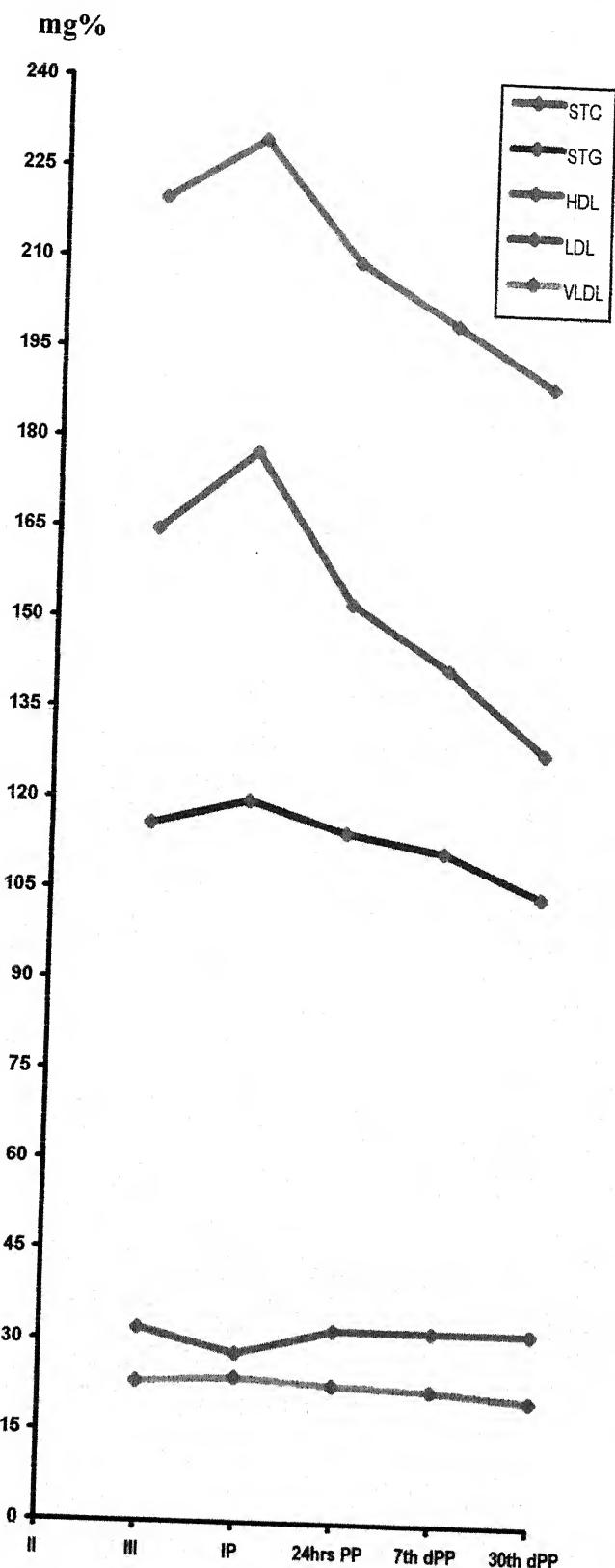
STC Immol/L = 38.76mg%

STG mmol/L = mg% $\times 0.0114$

HDL mmol/L = mg% / 38.76

Legend:

- * *7.5% ↑ in STC, maximum value during labour*
- * *9% ↓ in STC, with in 24hrs PP*
- * *11% ↑ in LDL, maximum value during labour*
- * *12% ↓ in LDL, with in 24hrs PP*
- * *9% ↓ in HDL, up to labour*



ECLAMPSIA GROUP

Case no 17

*Patient - Premwati
26yrs*

- * *Primi Gravida*
- * *Middle Socioeconomic Status*
- * *Vegetarian*
- * *C/o Unconscious during admission*
- * *BP 150/106 mm Hg*
- * *Urine - Protein present*
- * *LFT Normal & RFT Impaired*
- * *Out come \Rightarrow F.T.N.D, male baby wt 2.4 kg*

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	-	220	230	210	200	190
STG	-	116	120	115	112	105
HDL	-	32	28	32	32	32
LDL	-	164.8	178	153	142.6	129
VLDL	-	23.2	24	23	22.4	21

STC 1mmol/L = 38.76mg%

STG mmol/L = mg% $\times 0.0114$

HDL mmol/L = mg% / 38.76

Legend:

- * *5% \uparrow in STC, peak during labour*
- * *9% \downarrow in STC, with in 24hrs PP*
- * *10% \uparrow in LDL, peak during labour*
- * *12% \downarrow in LDL, with in 24hrs PP*
- * *12% \downarrow in HDL, up to labour*

TABLE VIII

Showing serum lipoprotein profile in eclamptic patients with still birth

	IIInd trimester	IIInd trimester	IP period	1st post partum day	7th post partum day	30th post partum day
STC mg % Mean \pm SD	---	251.8 \pm 42.78	278.0 \pm 39.2	236.8 \pm 34.45	222.0 \pm 31.59	205 \pm 7.0
STG mg % Mean \pm SD	---	1.31.2 \pm 23.59	142.4 \pm 25.27	118.8 \pm 20.67	113.5 \pm 22.24	100 \pm 14.14
HDL mg % Mean \pm SD	---	33.6 \pm 4.5	28.8 \pm 4.6	30 \pm 5.16	30 \pm 5.09	31 \pm 4.1
LDL mg% mean \pm SD	---	192.8 \pm 58.72	220 \pm 31.72	183 \pm 29.51	173.6 \pm 31.09	150 \pm 10
VLDL mg % mean \pm SD	---	26.2 \pm 4.72	28.4 \pm 6.81	24.4 \pm 4.72	22.6 \pm 5.02	20 \pm 2.8
no of cases (n)	---	5	5	5	5	2

Table VIII shows that STC raised from 251.8 ± 42.78 at 3rd trimester to 278 ± 39.2 at IP period and then declined to 236.8 ± 34.45 at 1st PP day and 222.0 ± 31.59 at 7th PP day reaching to 205 ± 7 at 30th PP day

III VS IP	p < .05
IP Vs 1st PP day	p < .05
IP Vs 7th PP day	p < .001

Similarly LDL raised from 192.8 ± 58.72 to 220 ± 31.72 at IP period which declined to **183** at 1st PP day and 173.6 ± 31.09 at 7th PP day

III Vs IP p < .001
 IP Vs 1st PP day p < .001
 IP Vs 7th PP day p < .001

HDL decreased from 33.6 ± 4.3 to 28.8 ± 4.6 at labour then raised to 31 ± 1 at 30th PP day

III Vs IP	p < .001
IP Vs 1st PP day	p > .05
IP Vs 7th PP day	p > .05

STG and VLDL raised from IIIrd trimester and reached to peak during labour , declined afterwards

TABLE IX**Serum Lipoprotein profile in relation to parity in cases of eclampsia**

	Parity	II trimester	III trimester	IP period	24 hrs PP	7th day PP	30th day PP
STC mg % mean \pm SD	Primi	-	228.5 \pm 40.36	239 \pm 43.71	210.9 \pm 34.93	202 \pm 31.3	190 \pm 21.6
	Multi	-	205.8 \pm 34.05	226.33 \pm 35.03	205.2 \pm 24.5	196.66 \pm 26.62	162 \pm 20.2
LDL mg % mean \pm SD	Primi	-	172.4 \pm 34	186.72 \pm 35.03	159.63 \pm 29.66	149.3 \pm 26	138.75 \pm 46.74
	Multi	-	154.16 \pm 19.8	174.6 \pm 30.2	153.4 \pm 23.66	146.5 \pm 26.73	115.5 \pm 9.2
HDL mg % mean \pm SD	Primi	-	33.1 \pm 3.03	28.9 \pm 9.64	30.7 \pm 3.32	31 \pm 11.7	29 \pm 4.76
	Multi	-	34.33 \pm 4.35	28.5 \pm 5.15	31.4 \pm 4.58	30.33 \pm 4.28	31 \pm 1.4
no of Cases	Primi	-	10	11	11	10	4
	Multi	-	6	6	5	6	2

Table IX shows that values of mean STC & mean LDL were higher during pregnancy, Labour and on 1st, 7th and 30th PP day in Primi Gravidae. In comparison to Multi Gravidae. But this difference was statistically not significant. HDL values were higher in Multi Gravidae during 3rd trimester and on 1st PP day and 30th PP day.

TABLE X**Serum Lipoproteins in eclamptic patients with unconsciousness**

	II trimester	III trimester	IP period	24 hrs PP	7th day PP	30th day PP
STC mg % mean \pm SD	-	244.2 \pm 40.21	267 \pm 36.2	230 \pm 32.2	220 \pm 31.8	200 \pm 10.1
STG mg % mean \pm SD	-	127.14 \pm 23.27	137.14 \pm 25.2	118.71 \pm 21.2	112.85 \pm 19.28	107.5 \pm 16.2
HDL mg % mean \pm SD	-	33.85 \pm 4.2	29.42 \pm 4.4	31.37 \pm 4.1	33.14 \pm 4.1	32 \pm 2.1
LDL mg % mean \pm SD	-	184.85 \pm 42.6	208.7 \pm 36.71	174.7 \pm 30.8	165 \pm 31.2	140 \pm 7.8
VLDL mg % mean \pm SD	-	26.14 \pm 4.82	28 \pm 6.2	23.85 \pm 6.21	24 \pm 4.71	21.5 \pm 3.2
no of Cases	-	7	7	7	7	2

Table X shows that STC value was 244.2 ± 40.21 during III trimester then raised to 267 ± 36.2 during labour and declined to 230 ± 32.2 at 1st PP day . 220 ± 31.8 at 7th PP day reaching to 200 ± 10.1 at 30th post partum day.

III Vs IP	p < .001
III Vs 1st PP day	P < .001
III Vs 7th PP day	p < .001
1st PP day Vs 7th Pp day	p < .001

LDL raised from 184.85 ± 42.6 to 208.7 ± 36.71 at labour , then decreased to 140.0 ± 7.8 at 30th PP day.

III Vs IP	p < .05
IP Vs 1st PP day	p < .001
IP Vs 7th PP day	p < .001

HDL declined from 33.85 ± 4.2 to 29.42 ± 4.4 at labour , then raised to 33.14 ± 4.1 mg% at 7th PP day .

III Vs IP	p < .001
IP Vs 1st PP day	p > .05
IP Vs 7th PP day	p < .001

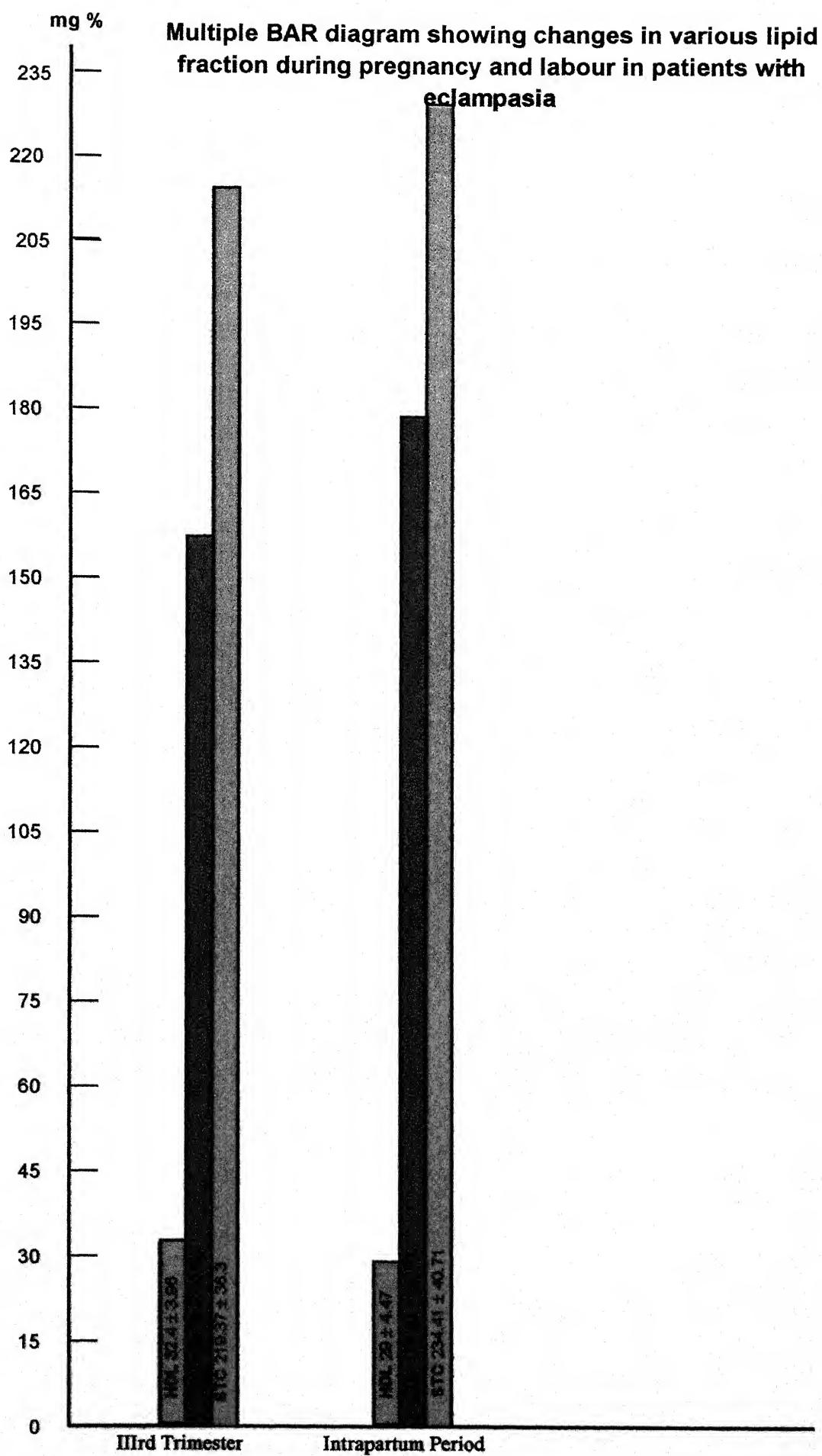


TABLE XI
Serum Lipoprotein Profile in cases of IUGR.

	II trimester	III trimester	IP period	24 hrs PP	7th day PP	30th day PP
STC mg % mean \pm SD	168.44 \pm 7.95	171.5 \pm 9	176.9 \pm 9.59	172.3 \pm 9.2	168.6 \pm 11.2	165.8 \pm 10.83
STG mg % mean \pm SD	87.88 \pm 4.13	93 \pm 6.23	97.2 \pm 7.1	92.7 \pm 5.62	89.6 \pm 6.0	91 \pm 4.29
HDL mg % mean \pm SD	37.33 \pm 1.9	33.9 \pm 1.76	31.8 \pm 1.94	32.4 \pm 2.24	32.9 \pm 2.86	32.83 \pm 3.36
LDL mg % mean \pm SD	113.53 \pm 8	119 \pm 8.6	125.4 \pm 8.77	121.2 \pm 8.24	117.8 \pm 7.24	113 \pm 9.83
VLDL mg % mean \pm SD	17.52 \pm 2.5	18.6 \pm 2.4	19.44 \pm 2.13	18.52 \pm 2.2	17.9 \pm 1.78	18.2 \pm 2.6
no of Cases	9	10	10	10	10	6

Table XI shows that STC at 2nd trimester was 168.44 ± 7.95 , it raised minimally to 176.9 ± 9.59 during labour, rise was statistically not significant, then it decreased to 165.63 ± 10.83 at 30th PP day

III Vs IP	p > .05
II Vs IP	p > .05
II Vs III	p > .05
IP Vs 1st PP day	p > .05
IP Vs 7th PP day	P > .05
IP Vs 30th PP day	p > .05

LDL raised minimally from 2nd trimester (113.5 ± 8.0) to 119.0 ± 8.67 at 3rd trimester and 125.4 ± 8.77 during labour, it decreased to 121.2 ± 8.24 on 1st PP day, 117.8 ± 7.24 mg % on day 7th

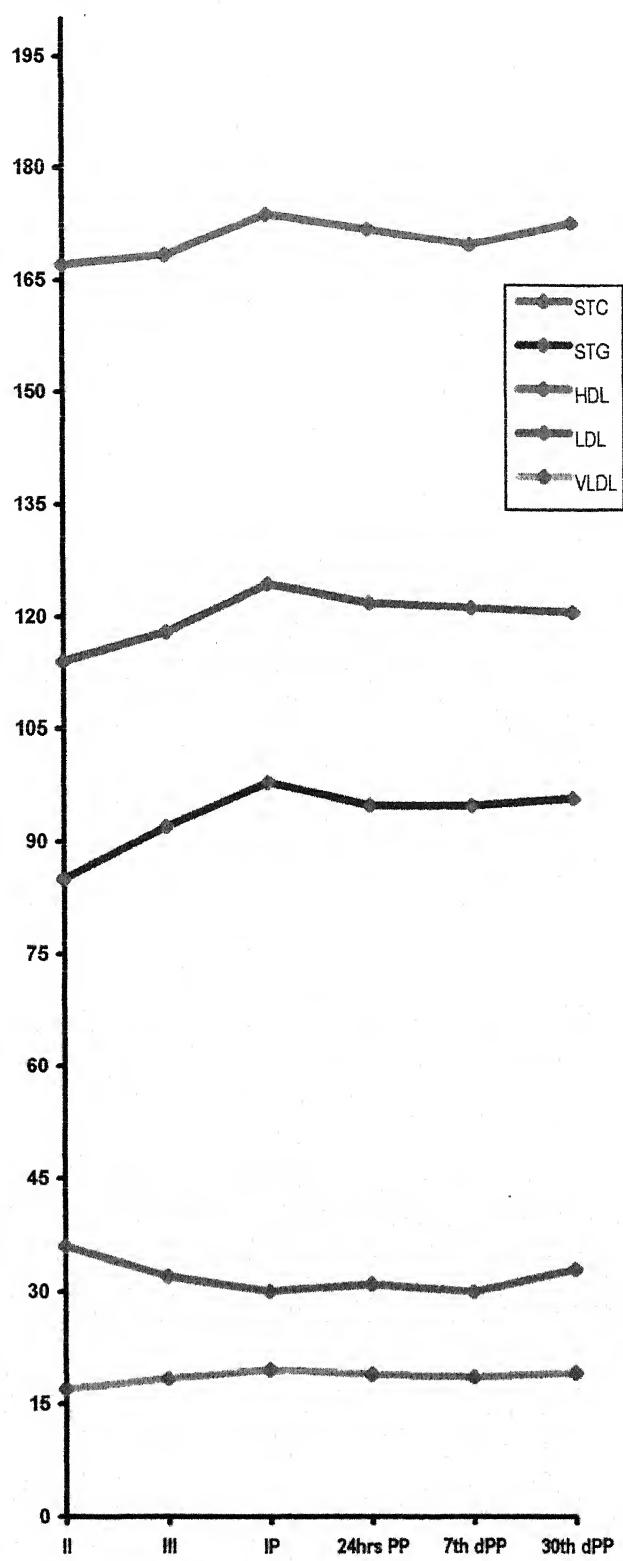
II Vs III	p > .05
III Vs IP	p > .05
II Vs IP	p > .05
IP Vs 1st PP day	p > .05
IP Vs 7th PP day	p > .05
IP Vs 30 th PP day	p > .05

HDL declined from 37.35 ± 1.9 to 33.9 ± 1.76 from 2nd trimester to 3rd trimester, it further decreased to 31.8 ± 1.94 at labour. This fall was statistically significant then it raised to 32.83 ± 3.36 on the 30th day

II Vs III	p < .05
II Vs IP	p < .001

Similarly STG and VLDL raised from 2nd trimester to labour and declined thereafter this rise was statistically not significant.

mg%



I U G R GROUP

Case no 1

*Patient - Sunita
26yrs*

- * *G5P4L3*
- * *Middle Socioeconomic Status*
- * *Vegetarian*
- * ***C/o Failure to gain weight***
- * *Fundal height does not correspond to period of Amenorrhoea*
- * *USG - Showing mod. to severe IUGR with Oligohydramnios*
- * *Out come \Rightarrow LSCS done due to foetal distress male baby wt 1.9 kg*

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	167	168.4		174	172	170
STG	85	92		98	95	93
HDL	36	32		30	31	30
LDL	114	118		124.4	122	121.4
VLDL	17	18.4		19.6	19	18.6
						19.2

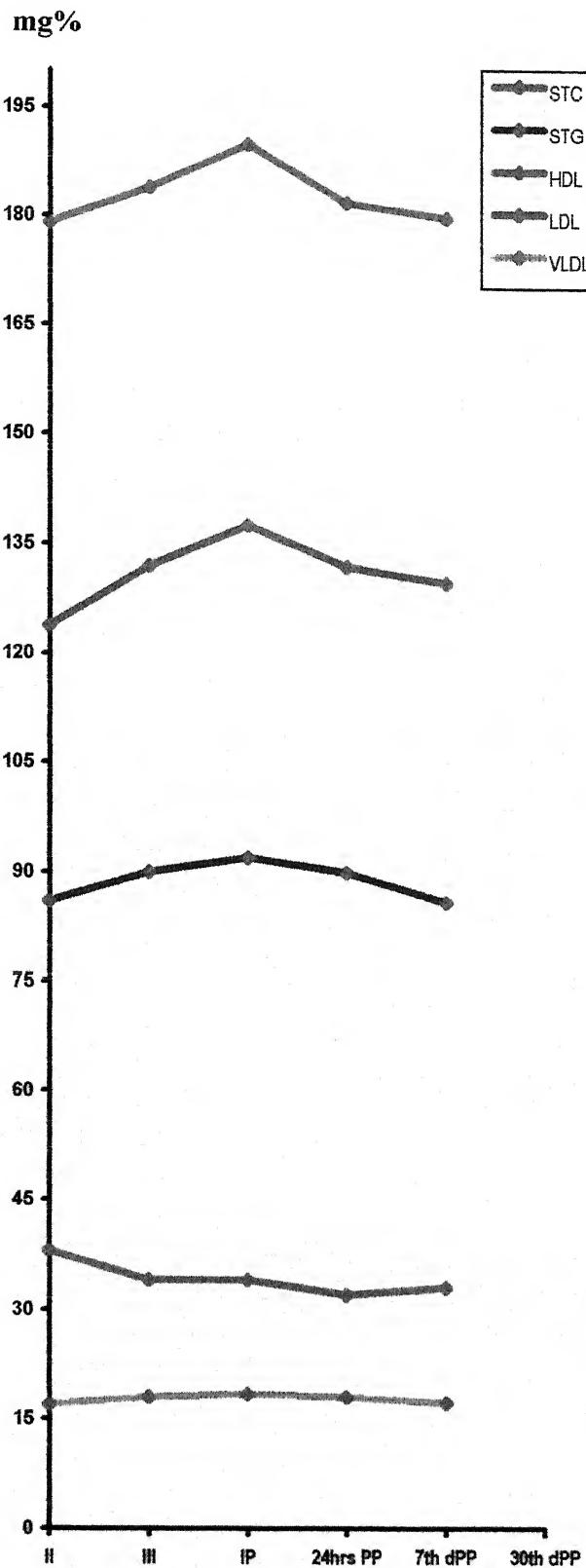
STC 1 mmol/L = 38.76 mg%

STG mmol/L = mg% $\times 0.0114$

HDL mmol/L = mg% / 38.76

Legend :

- * *16% \downarrow in HDL, up to labour*
- * *slight \uparrow in STC, maximum value during labour*
- * *8% \uparrow in LDL, maximum value during labour*



I U G R GROUP

Case no 2

Patient - Sunita
24yrs

- * *Primi Gravida*
- * *Lower Socioeconomic Status*
- * *Vegetarian*
- * *C/o Swelling over body, weakness*
- * *Fundal height does not correspond to period of Amenorrhoea*
- * *Hb. 4 gm%, S. Proteins 3gm%*
- * *USG - Showing mild IUGR*
- * *Out come \Rightarrow Premature Vaginal delivery female baby, wt 2.1 kg*

	Values mg%					
	II	III	IP	24hrs period	7th PP	30th dPP
STC	179	184	190	182	180	-
STG	86	90	92	90	86	-
HDL	38	34	34	32	33	-
LDL	124	132	137.6	132	129.8	-
VLDL	17	18	18.4	18	17.2	-

STC 1mmol/L = 38.76mg%

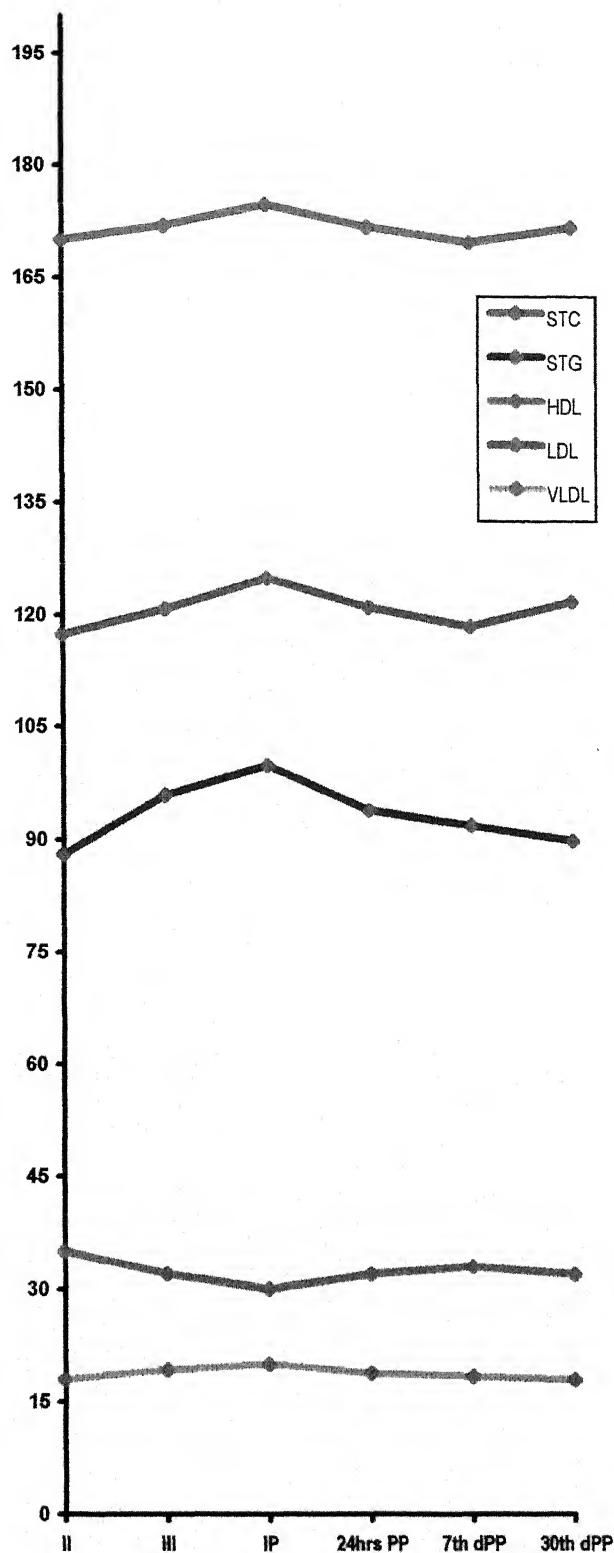
STG mmol/L = mg% \times 0.0114

HDL mmol/L = mg% / 38.76

Legend :

- * *11% ↓ in HDL, up to labour*
- * *5% ↑ in STC, maximum value during labour*
- * *11% ↑ in LDL, maximum value during labour*

I U G R GROUP



Case no 3

*Patient - Uma Verma
22yrs*

- * *Primi Gravida*
- * *Middle Socioeconomic Status*
- * *Non Vegetarian*
- * *Pt. Known case of systemic H.T without features of toxæmia*
- * *Fundal height does not corresponding to period of Amenorrhoea*
- * *USG - Showing mod. to severe IUGR*
- * *Out come \Rightarrow LSCS done male baby wt 1.8 kg*

	<i>Values mg%</i>					
	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	170	172	175	172	170	172
STG	88	96	100	94	92	90
HDL	35	32	30	32	33	32
LDL	117.4	120.8	125	121.2	118.6	122
VLDL	17.6	19.2	20	18.8	18.4	18

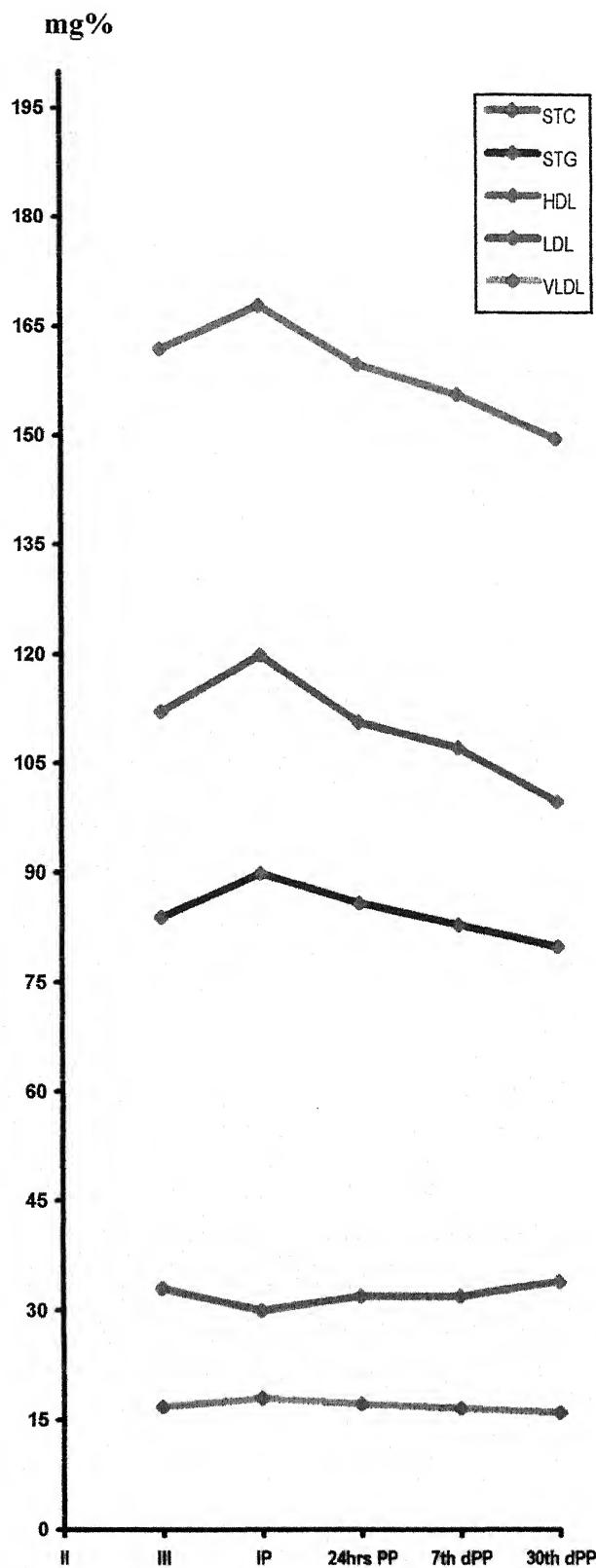
STC 1mmol/L = 38.76mg%

STG mmol/L = mg% $\times 0.0114$

HDL mmol/L = mg% / 38.76

Legend :

- * *14% ↓ in HDL, up to labour*
- * *slight ↑ in STC, maximum value during labour*
- * *6% ↑ in LDL, maximum value during labour*



I U G R GROUP

Case no 4

Patient - Geeta Tewari
26yrs

- * G4P3L3
- * Middle Socioeconomic Status
- * Vegetarian
- * C/o Painless, recurrent vaginal bleeding
- * Fundal height does not corresponding to period of Amenorrhoea
- * USG - Showing major degree of placenta praevia with mild IUGR
- * Out come \Rightarrow LSCS done male baby wt 2.3 kg

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	-	162	168	160	156	150
STG	-	84	90	86	83	80
HDL	-	33	30	32	32	34
LDL	-	112.2	120	110.8	107.4	100
VLDL	-	16.8	18	17.2	16.6	16

STC 1mmol/L = 38.76mg%

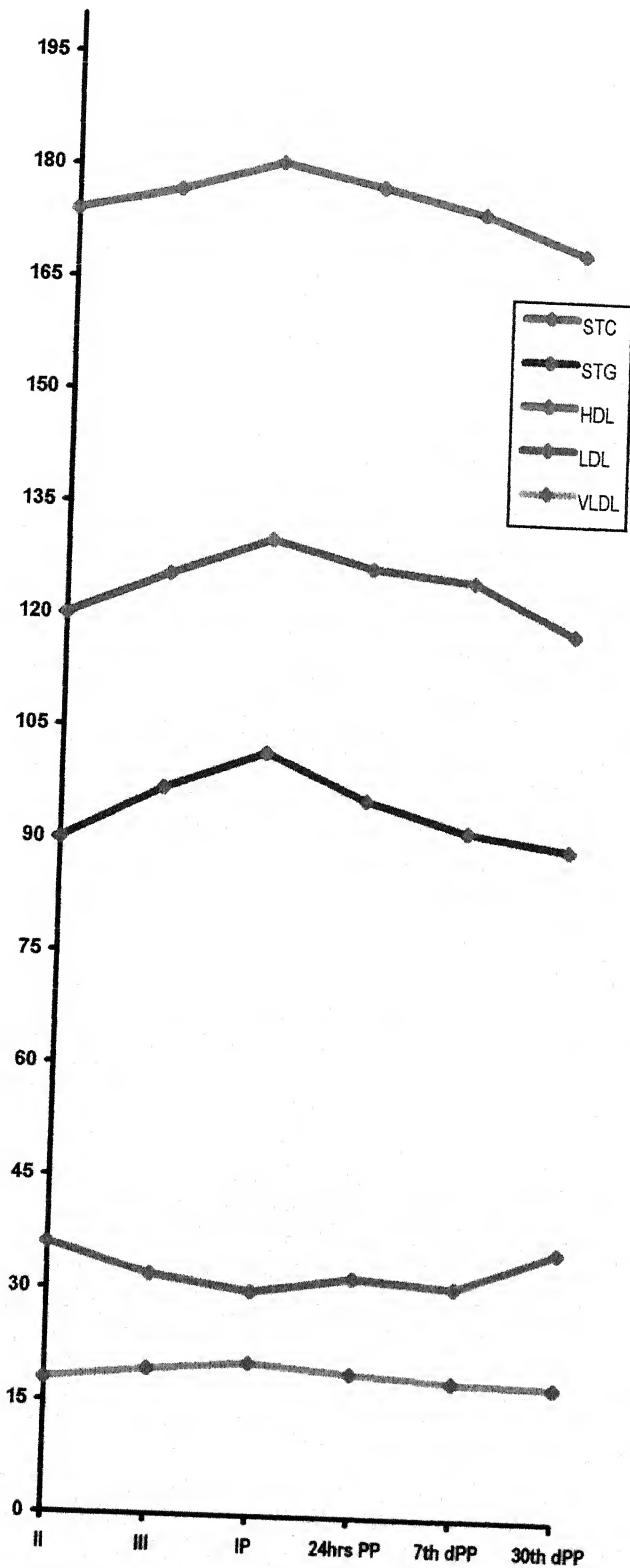
STG mmol/L = mg% \times 0.0114

HDL mmol/L = mg% / 38.76

Legend :

- * 9% \downarrow in HDL, up to labour
- * slight \uparrow in STC, maximum value during labour
- * 7% \uparrow in LDL, maximum value during labour

mg%



I U G R GROUP

Case no 5

Patient - Rekha
20yrs

- * *Primi Gravida*
- * *Lower Socioeconomic Status*
- * *Vegetarian*
- * *Detected on routine Antenatal checkup*
- * *Fundal height does not corresponding to period of Amenorrhoea*
- * *USG - Showing severe degree of IUGR*
- * *Complication aspiration pneumonitis*
- * *Out come \Rightarrow LSCS done after 38 weeks due to severity of IUGR female baby, wt 1.8 kg*

	Values mg%					
	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	174	177	181	178.2	175	170
STG	90	97	102	96	92	90
HDL	36	32	30	32	31	33
LDL	120	125.6	130.6	127	125.6	119
VLDL	18	19.4	20.4	19.2	18.4	18

STC 1mmol/L = 38.76mg%

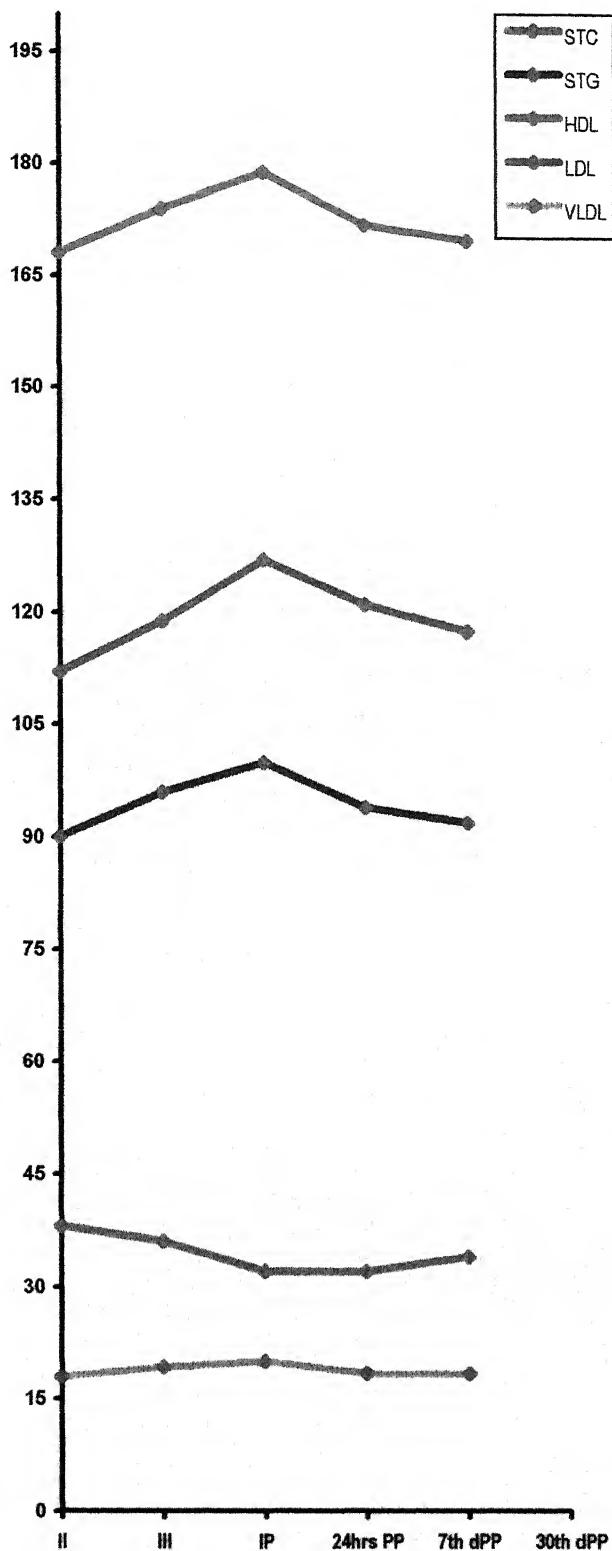
STG mmol/L = mg% $\times 0.0114$

HDL mmol/L = mg% / 38.76

Legend :

- * *16.6%↓ in HDL, up to labour*
- * *slight ↑ in STC, maximum value during labour*
- * *8% ↑ in LDL, maximum value during labour*

mg%



I U G R GROUP

Case no 6

*Patient - Kusum
25yrs*

- * *G2 P2 L2*
- * *Lower Socioeconomic Status*
- * *Vegetarian*
- * *Detected on routine Antenatal checkup*
- * *Fundal height does not corresponding to period of Amenorrhoea*
- * *USG - Showing evidence of mild IUGR with Small placenta*
- * *Out come \Rightarrow Premature vaginal delivery, female baby, wt 2.2 kg*

Values mg%

	II	III	IP	24hrs period	7th PP	30th dPP
STC	168	174	179	172	170	-
STG	90	96	100	94	92	-
HDL	38	36	32	32	34	-
LDL	112	118.8	127	121.2	117.6	-
VLDL	18	19.2	20	18.8	18.4	-

STC 1mmol/L = 38.76mg%

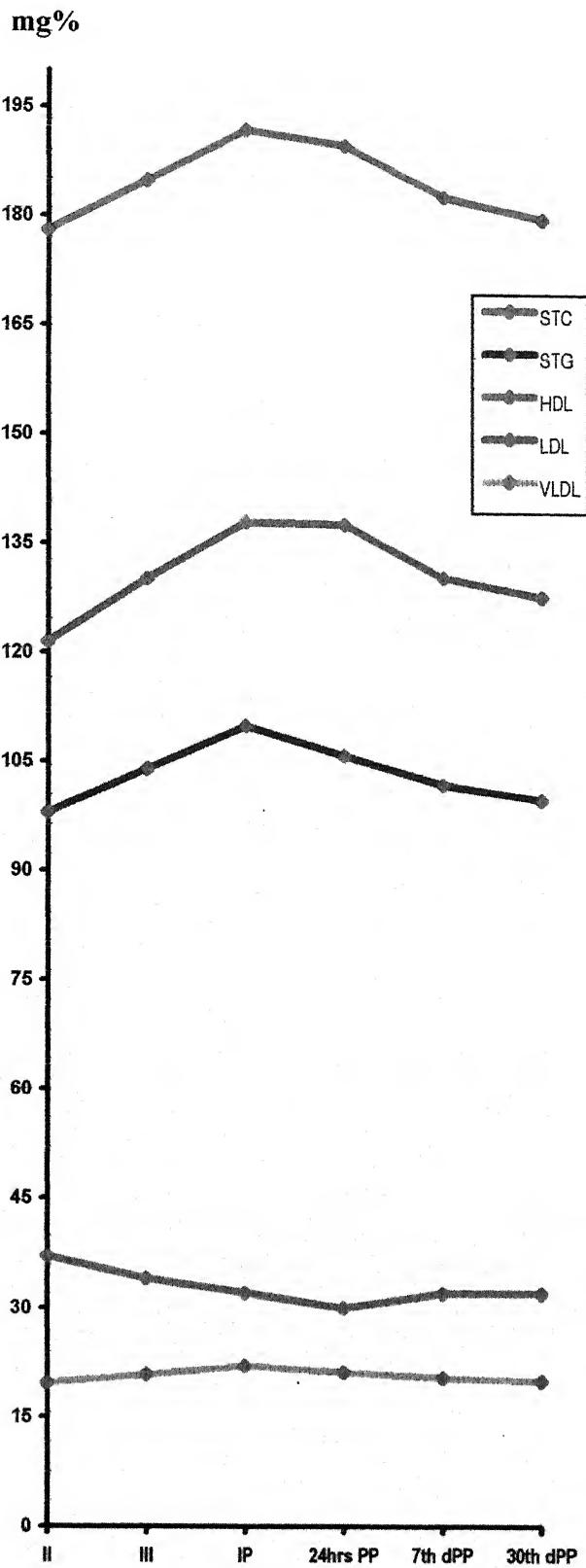
STG mmol/L = mg% $\times 0.0114$

HDL mmol/L = mg% / 38.76

Legend :

- * *16% \downarrow in HDL, up to labour*
- * *6% \uparrow in STC, maximum value during labour*
- * *10% \uparrow in LDL, maximum value during labour*

I U G R GROUP



Case no 7

*Patient - Kaushailya
26yrs*

- * *G4 P3 L3*
- * *Middle Socioeconomic Status*
- * *Vegetarian*
- * *C/o Failure to gain weight*
- * *Fundal height does not correspond to period of Amenorrhoea*
- * *USG - Showing evidence of mild IUGR with Oligohydramnios*
- * *Out come \Rightarrow F.T.N.D, male baby wt 2.2 kg*

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	178	185	192	190	183	180
STG	98	104	110	106	102	100
HDL	37	34	32	30	32	32
LDL	121.4	130.2	138	137.8	130.6	128
VLDL	19.6	20.8	22	21.2	20.4	20

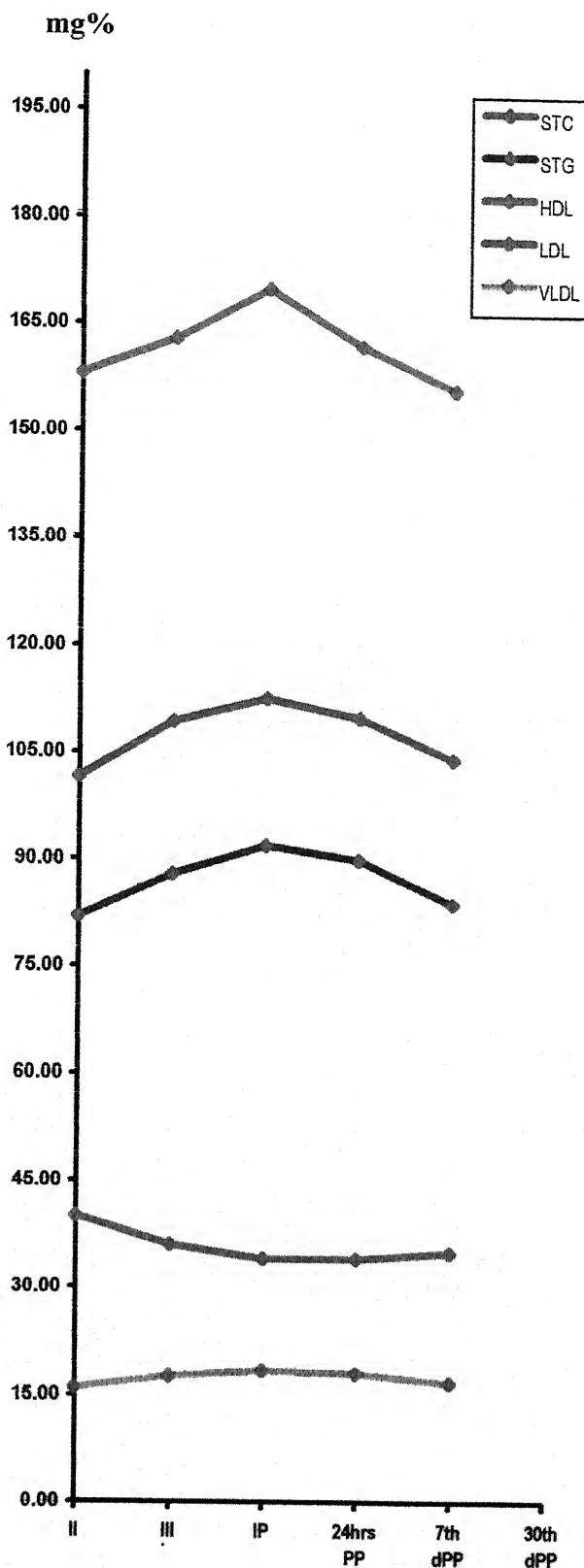
STC 1mmol/L = 38.76mg%

STG mmol/L = mg% \times 0.0114

HDL mmol/L = mg% / 38.76

Legend :

- * *13%↓ in HDL, up to labour*
- * *7%↑ in STC, maximum value during labour*
- * *12%↑ in LDL, maximum value during labour*



I U G R GROUP

Case no 8

Patient - Nafisa
26 yrs

- * G3P2L2
- * Lower Socioeconomic Status
- * Non Vegetarian
- * Patient known case of Rheu.H.D
- * Fundal height does not corresponding to period of Amenorrhoea
- * USG - Showing evidence of mild IUGR
- * Out come \Rightarrow F.T.N.D, female baby wt 2.35 kg

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	158	163	170	162	156	-
STG	82	88	92	90	84	-
HDL	40	36	34	34	35	-
LDL	101.6	109.4	112.6	110	104.2	-
VLDL	16.4	17.6	18.4	18	16.8	-

$$STC \text{ mmol/L} = 38.76 \text{ mg\%}$$

$$STG \text{ mmol/L} = \text{mg\%} \times 0.0114$$

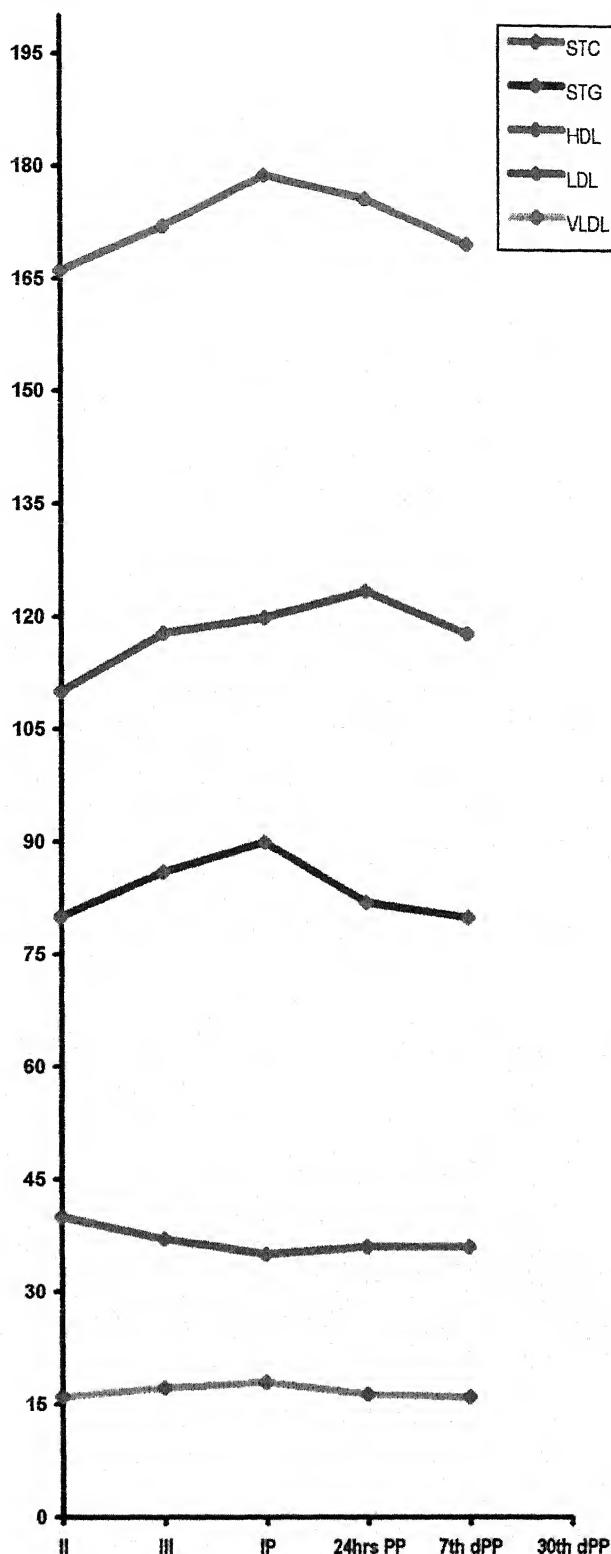
$$HDL \text{ mmol/L} = \text{mg\%} / 38.76$$

Legend :

- * 15%↓ in HDL, up to labour
- * 7%↑ in STC, maximum value during labour
- * 12%↑ in LDL, maximum value during labour

mg%

mg%



I U G R GROUP

Case no 9

*Patient - Sushma
25yrs*

- * *G1P1L0*
- * *Middle Socioeconomic Status*
- * *Vegetarian*
- * ***C/o Failure to gain weight***
- * *Fundal height does not correspond to period of Amenorrhoea*
- * *USG - Showing mild IUGR*
- * *Out come \Rightarrow Premature vaginal delivery, male baby wt 2.0 kg*

	Values mg%					
	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	166	172	179	176	170	-
STG	80	86	90	82	80	-
HDL	40	37	35	36	36	-
LDL	110	117.8	120	123.6	118	-
VLDL	16	17.2	18	16.4	16	-

STC 1mmol/L = 38.76mg%

STG mmol/L = mg% \times 0.0114

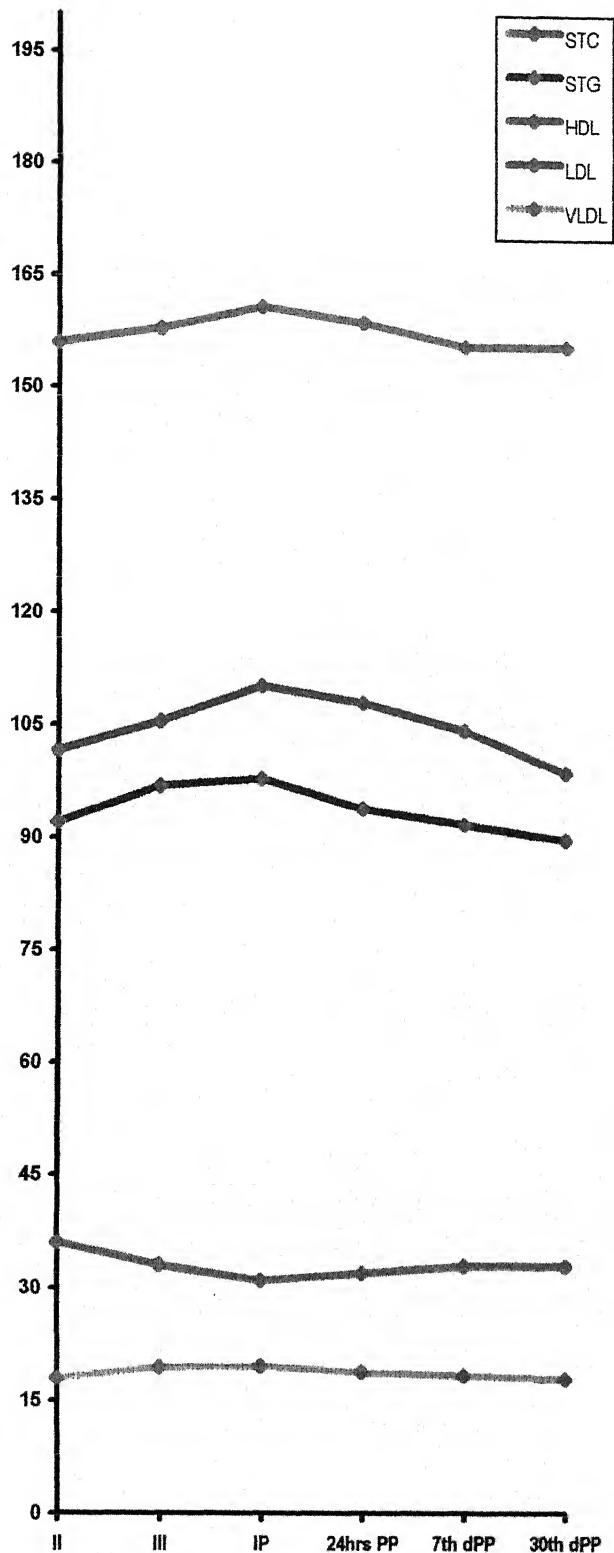
HDL mmol/L = mg% / 38.76

Legend :

- * *12%↓ in HDL, up to labour*
- * *8%↑ in STC, maximum value during labour*
- * *9%↑ in LDL, maximum value during labour*

mg%

mg%



I U G R GROUP

Case no 10

*Patient - Pista
26 yrs*

- * *G3 P2 L2*
- * *Lower Socioeconomic Status*
- * *Vegetarian*
- * *Detected on routine checkup*
- * *Fundal height does not correspond to period of Amenorrhoea*
- * *USG - Showing evidence of severe IUGR with Small placenta with Oligohydramnios*
- * *Out come \Rightarrow LSCS done due to failed surgical induction delivery of dead female baby*

Values mg%

	II	III	IP period	24hrs PP	7th dPP	30th dPP
STC	156	158	161	159	156	156
STG	92	97	98	94	92	90
HDL	36	33	31	32	33	33
LDL	101.6	105.6	110.4	108.2	104.6	99
VLDL	18.4	19.4	19.6	18.8	18.4	18

STC 1mmol/L = 38.76mg%

STG mmol/L = mg% $\times 0.0114$

HDL mmol/L = mg% / 38.76

Legend :

- * *14% \downarrow in HDL, up to labour*
- * *slight \uparrow in STC, maximum value during labour*
- * *10% \uparrow in LDL, maximum value during labour*

TABLE XII
Serum Lipoprotein Profile in cases of IUGR in relation to severity of IUGR

	severity	II trimester	III trimester	IP period	24 hrs PP	7th day PP	30th day PP
STC mg % mean \pm SD	Severe	166.75 \pm 7.5	168.75 \pm 8	173.75 \pm 8.49	170.25 \pm 7	167.75 \pm 7.4	166.25 \pm 8.2
	Mild	170.13 \pm 8.79	174.25 \pm 9.89	180 \pm 9.8	174.4 \pm 10.4	169.45 \pm 9.2	165.41 \pm 8.7
LDL mg % mean \pm SD	Severe	112.75 \pm 8.17	117 \pm 5.51	122.5 \pm 8.6	119.5 \pm 7.4	117 \pm 6.2	115 \pm 5.6
	Mild	114.31 \pm 8.99	121 \pm 9.4	128.83 \pm 8.59	122.9 \pm 7.4	118.6 \pm 6.8	111 \pm 5.4
HDL mg % mean \pm SD	Severe	35.75 \pm .5	32.25 \pm .5	30.25 \pm .57	31.75 \pm .5	31.75 \pm .42	32.75 \pm .38
	Mild	38.91 \pm 1.38	35.55 \pm 1.64	33.35 \pm 1.9	33.05 \pm 1.55	34.05 \pm 2.0	32.91 \pm 1.8

Table XII shows that there was rise in both subgroups of IUGR in STC and LDL from IIInd trimester to IIIrd trimester and from IIIrd to labour & it was statistically not significant. But fall in HDL from 2nd trimester to labour was staistically significant.

Values of STC , LDL were higher in subjects with mild IUGR while these were lower in subjects with severe IUGR. But these changes were statistically not significant . Values of HDL were lower in severe IUGR group in comparison to mild IUGR in the corresponding period of pregnancy , during labour and there after.

IIInd trimester	mild vs severe	p < .05
IIIrd trimester	mild vs severe	p < .001
during labour	mild vs severe	p < .001
1st PP day	mild vs severe	p < .05

TABLE XIII COMPARING LIPOPROTEIN PROFILE IN CASES OF PREECLAMPSIA, ECLAMPSIA AND IUGR DURING IIIrd TRIMESTER OF PREGNANCY.

GROUP	No.of cases	STCmg% mean+S.D	LDLmg% mean+S.D	HDL mg% mean+S.D
Preeclampsia Gp "A"	9	196.77 \pm 30	140.56 \pm 22.48	33.52 \pm 5.52
Eclampsia Gp "B"	17	219.37 \pm 36.3	156.88 \pm 29.96	32.41 \pm 3.96
IUGR Gp "C"	10	171.5 \pm	119.0 \pm 8.67	33.9 \pm 1.76

Table XIII shows that during IIIrd trimester mean STC values was highest in subjects with eclampsia , then in subjects with pre- eclampsia and lowest in subjects with IUGR . This was statistically significant.

A Vs C p < .001
 B Vs C p < .001
 A Vs B p < .05

Similarly mean LDL value was highest among eclampsia Gp , then in subjects with pre-eclampsia and lowest in IUGR group.

A Vs C p < .05
 B Vs C p < .001
 A Vs B p > .05

mean HDL value was nearly equal in subjects with pre-eclampsia and IUGR

A Vs C p > .05
 B Vs C p > .05
 A Vs B p > .05

TABLE XIV COMPARING SERUM LIPOPROTEIN PROFILE IN CASES OF PREECLAMPSIA,ECLAMPSIA & IUGR DURING LABOUR

GROUP	No.of cases	STCmg% mean+S.D	LDLmg% mean+S.D	HDL mg% mean+S.D
Preeclampsia	10	207.8± 28.86	152.98± 22.50	32.0± 4.12
Eclampsia	17	234.41± 40.17	178.82± 32.03	29.0± 4.47
IUGR	10	176.9± 11.20	125.4± 10.83	31.8± 3.34

Table XIV shows that during labour mean STC and mean LDL values were highest in subjects with eclampsia , then in subjects with pre-eclampsia and lowest in subjects with IUGR.

For STC & LDL A Vs C p < .001
 B Vs C p < .001
 A Vs B p < .001

Mean HDL value was maximum in pre-eclampsia and minimum in eclampsia

A Vs C p > .05
 B Vs C p > .05
 A Vs B p > .05

**TABLE XV SHOWING LIPOPROTEIN PROFILE IN CASES OF
PREECLAMPSIA, ECLAMPSIA AND IUGR ON 30th POST PARTUM
DAY.**

GROUP	No.of cases	STCmg% mean+S.D	LDLmg% mean+S.D	HDL mg% mean+S.D
Preeclampsia	4	172.5± 32.24	116.1± 24.49	35.0± 3.36
Eclampsia	6	160.83± 24.5	131.0± 16.27	29.6± 3.88
IUGR	6	165.83±	113.00± 9.83	32.83± 3.36

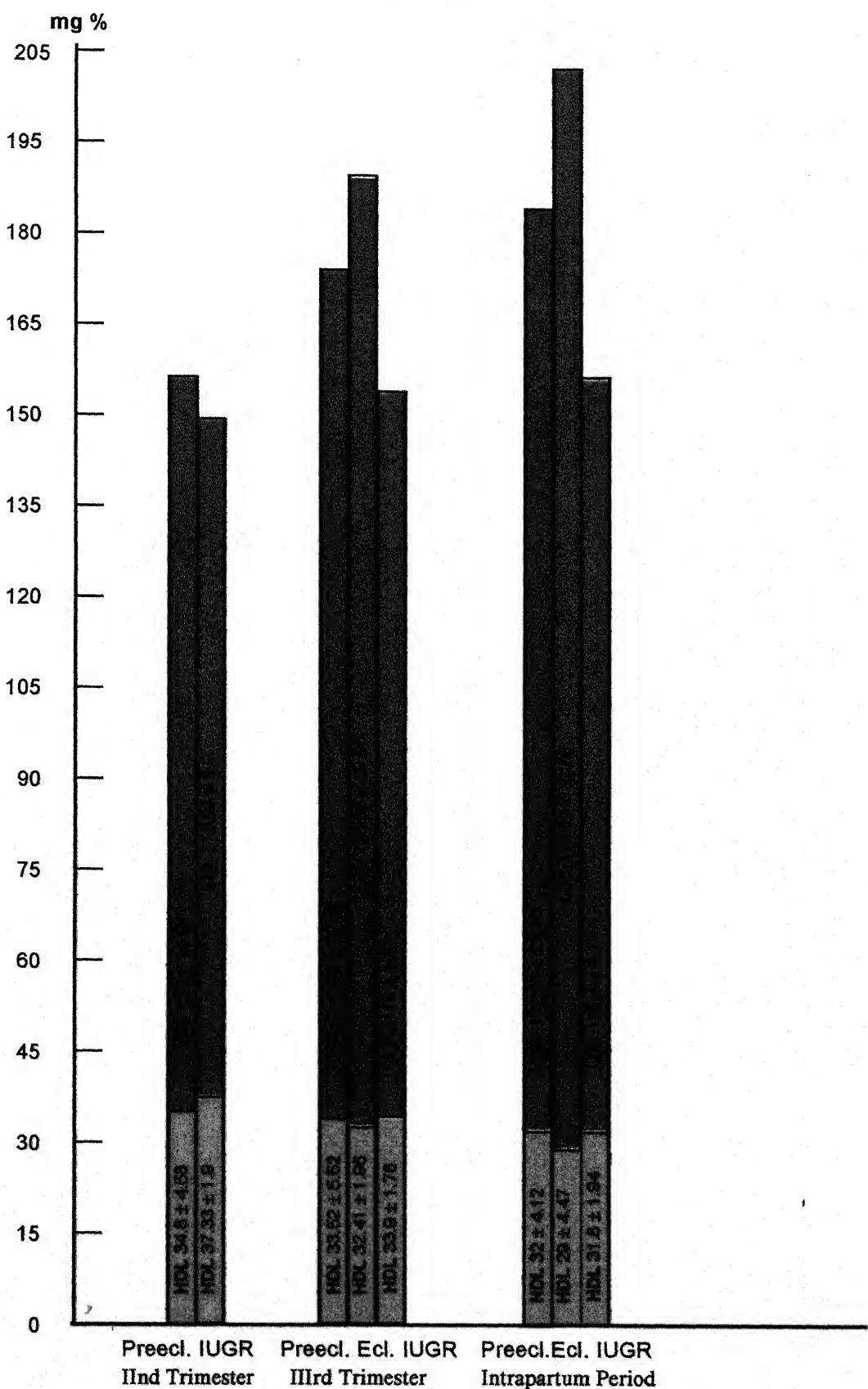
Table XV shows that STC and LDL values were highest in eclampsia , then in pre-eclampsia and lowest in subjects with IUGR

For STC and LDL A Vs B $p > .05$
 A Vs C $p > .05$
 B Vs C $p < .05$

HDL value was highest in subjects with pre-eclampsia

A Vs C	$> .05$
B Vs C	$> .05$
A Vs B	$< .05$

**Component BAR Diagram Showing changes in HDL and LDL during
Pregnancy and labour in patients with preeclampsia, Eclampsia and IUGR**



DISCUSSION

DISCUSSION

Hyperlipidaemia of pregnancy is now an established fact. Levels of hormones like oestrogen and progesterone significantly increase during pregnancy and falls with the expulsion of placenta so these hormones are indirectly responsible for altered lipid profile of pregnancy. So in cases of complicated pregnancy (Preeclampsia, Eclampsia & IUGR) there may be alteration in hormone levels which in turn will lead to alteration in lipid profile. So this study include changes in serum lipoproteins in cases of pre eclampsia, eclampsia and IUGR and comparison of these changes with each other.

The Basal level of plasma lipids in normal subjects are as follows:-

STC	=	< 200 mg%
STG	=	< 160 mg %
HDL	=	30 - 90 mg %
LDL	=	50 - 130 mg %
VLDL	=	< 32 mg %

(Annal . int medicine . 1993, 119 (7) part 1.)

1. PRE ECLAMPTIC AND ECLAMPTIC Pts (GROUP A ,GROUP B) :

The observed mean STC during 2nd trimester was 178.33 ± 21.0 , which increased to 196.77 ± 30 mg % at 3rd trimester, and reaching to 207.8 ± 28.86 mg% during labour . This rise in STC during pregnancy in cases of preeclampsia was statistically significant.

This level abruptly declined to 183.2 ± 25.36 on 24 hours P.P. and slowly reached to 172.5 ± 33.24 on 30th P.P. day. This fall on 1st P.P. day was also statistically significant.

Similarly in eclampsia mean STC level during 3rd trimester was 219.37 ± 36.3 mg % which touched to a peak of 234.41 ± 40.17 mg % during labour and declined to 209.45 ± 31.2 mg % on 24hrs P.P. These changes were statistically significant .STC decreased to 180.83 ± 24.5 mg % on 30th P.P. day which was much less than the value at 3rd trimester . This rise in STC upto labour was in accordance with Nelson ,1966, Pontis and Purandare ,1972,Hyten and Lind ,1973,Chaturvedi , Tandon and Singh ,1978.

The rise in STC level from 3rd trimester to I.P. was much less than fall with in 24 hrs. P.P. pt's . with eclampsia ,this may be due to the

fact that the values of third trimester were unusually at the end of third trimester and pt's usually delivered with in 2-5 days after admission

Values of STC in pt's with eclampsia were much higher in comparison to patients with pre eclampsia in the corresponding period of gestation and these changes were statistically significant .

Rise in STC from 3rd trimester to labour was slightly more 6.8% in eclamptic pt's in comparison to pre eclampsia 5.5%. Fall in STC level with in 24 hrs P.P. was 10.6% in eclamptic pt's ,while in pt's with pre eclampsia it was 11%,it was nearly equal .

SERUM LOW DENSITY LIPOPROTEIN - LDL-C :

The observed mean LDL value during 2nd trimester in cases of pre eclampsia was 123.9 ± 14.94 mg % ,it increased to 140.56 ± 22.48 at 3rd trimester and touched to a peak of 152.98 ± 22.50 during labour . Rise from 2nd trimester to 3rd trimester and from 2nd trimester to labour was statistically significant .

However rise from 2nd to 3nd trimester was not significant statistically .These value declined to 127.90 ± 20.07 on 24 hrs P.P., 119.80 ± 21.01 on 7th day P.P. day 116.1 ± 24.49 on 30th day P.P which was little less than the value at 2nd trimester .

Observed mean LDL-c value in pt's with eclampsia was 156.88 ± 29.96 at 3rd trimester,during labour it was 178.82 ± 32.03 this rise in LDL was statistically significant these values declined to 157.37 ± 20.87 on 1st P.P.day, it decreased to 131 ± 16.27 on 30th P.P. day .It was much less than the value at 3rd trimester.The fall after labour was also statistically significant.

Values of LDL -C in pt's with Eclampsia were much higher in comparison to pre eclampsia during Pregnancy,labour and post partum period. Percentage rise of LDL -C was higher in pt's with eclampsia (14%) from 3rd trimester to labour ,in comparison to 8% in pt's with pre eclampsia ,the difference in LDL -C value at 3rd trimester between pt's with pre eclampsia and eclampsia was statistically not significant but it became statistically significant during labour due to more rise of LDL -C in eclamptic patients.

Fall in LDL value was 11.8% in pt's with eclampsia ,while it was 16% in pt's with pre eclampsia.Similar findings were reported by Konttinen et al,1964 Mullick and Bagga 1964,Barclay et al,Worth et al 1975,Pontis et al and Knopp et al 1981.

Similar finding were reported by Kontinen et al, 1964, Mullick and Bagga , 1964,Barclay et al worth et al ,1975, Pontis et al and Knopp et al ,1981 .

HDL -C :

The observed mean HDL level during 2nd trimester was 34.8 ± 4.58 in pre eclamptic pt's ,it declined to 32 ± 4.12 during labour .This fall was statistically just significant .The level of HDL started rising again soon after labour and it reached to 35.0 ± 3.36 at 30th P.P. day .In pt's with eclampsia the mean level of HDL during 3rd trimester was 32.4 ± 3.96 mg % which decreased to 29 ± 4.47 during labour and gradually raised to 30.1 ± 5.40 on 24 hrs P.P. and further decreased to 29.6 on 30th P.P.day .The fall in HDL from 3rd trimester to labour was statistically highly significant .

When we compared HDL level in both groups we found that mean value of HDL was much lower in pt's with eclampsia than in pre-eclampsia in the corresponding period of gestation , labour and after delivery. The difference in the values during labour and in the post partum period was statistically significant the HDL level started rising early in pts with pre-eclampsia while in pts. with eclampsia value remained on lower side even upto 30th P.P. day . Total decrease of HDL-C from 3rd trimester to labour was only 8.04 % in pts. with pre-eclampsia while it was 11.7 % in pt's with eclampsia .

As level of HDL-C is influenced by the level of Oestrogen and Oestrogen during pregnancy are mainly synthesized by placenta . HDL-C reflects placental function . Toxaemia of pregnancy is associated with chronic placental insufficiency leading to decreased production of Oestrogen . In our study we also found the same type of change that is fall of HDL level in Pts of eclampsia and pre-eclampsia during pregnancy . HDL - C in pre-eclampsia has also been reported previously (Scandrett , 1959).

Serum Triglycerids (STG)

In patients with pre-eclampsia the observed mean STG value was 97.2 ± 16 during 2nd trimester , it raised to 110 ± 20.33 during labour after labour it declined to 99.9 ± 19.2 on 1st P.P. day and further decreased to 89.5 ± 22.52 on 30th P.P. day . The rise in STG in pts with pre-eclampsia from 2nd trimester to labour was 13.4 % and it was statistically significant . STG in pre-eclamptic pts showed a decreasing trend during post partum period.

In pts with eclampsia mean STG values were 111.75 ± 24.79 during 3rd trimester, 114.82 ± 26.42 during labour and it decreased thereafter to 85.5 ± 18.02 on 30th P.P. day. rise from 3rd trimester to labour was only 2.6% and it was statistically not significant. These findings are in accordance with previous observations (Kontinen et al 1979, Kalkhoff et al 1978, Knopp et al, 1981, Dermandy et al, 1989). While comparing the values. In the same period in both group of patients values were higher among patients with eclampsia except on 30th P.P. day. Slow rise in STG during pregnancy in both group of patients may be due to the fact that toxæmia of pregnancy is associated with chronic placental insufficiency leading to decreased production of Oestrogens.

Very Low Density lipoproteins - VLDL

In pt's with pre-eclampsia, VLDL values were 19.28 ± 3.3 during 2nd trimester, 22.1 ± 3.81 during labour and thereafter it gradually decreased to 18.5 ± 4.11 on 7th P.P. day and 17.9 ± 4.5 on 30th P.P. day. Rise in VLDL was 14.5% upto labour and it was statistically significant.

In pts with eclampsia VLDL values were 22.35 ± 5.12 during 3rd trimester; 23 ± 5.38 during labour and 17 ± 3.94 on 30th P.P. day. there was very slight rise (3%) from 3rd trimester to labour in pts with eclampsia.

We divided the pts of pre-eclampsia broadly into twogroups depending on it's severity.

- patients with mild pre-eclampsia
 - * BP < 160/110 mm Hg
 - * Proteinuria absent
- patients with severe pre-eclampsia
 - * BP > 160/110 mm Hg
 - * Protein uria present

Though values of STC, LDL during 2nd trimester were less in patients with severe pre-eclampsia but rise was more in comparison to patients with mild IUGR. Percentage rise in STC and LDL was 13.8% and 20 % respectively in pts with mild pre-eclampsia while it was 21 % and 26% in pts with severe pre-eclampsia. Values of HDL were lower in patients with severe pre-eclampsia and this difference was statistically significant.

We also studied the serum lipoprotein profile in cases of pre-eclampsia who delivered low birth weight babies (weight < 2.5 kg). There

was not much difference in levels of STC and LDL in pts who delivered LBW babies from the mean value for the whole group as such. However decrease in HDL level from 2nd trimester to labour was more (13%) in this group in comparison to whole group where it was 8%.

Serum lipoprotein in pt's with unfavourable outcome -

In our study incidence of prematurity was 20% in patients with pre-eclampsia while incidence LBW babies was 30%.

In contrast to pts. with pre-eclampsia , patients of eclampsia who delivered still births (5 out of 18) child showed marked deviation of serum lipoproteins from other patients of similar groups . mean value of STC in patients who delivered still birth child during 3rd trimester was 251.3 ± 42.78 while the mean value of whole group was 219.37 ± 36.3 , it raised to 278.0 ± 39.2 during labour it decreased to 236.8 ± 34.45 on 24 hrs P.P. and came to 205 ± 7 on 30th P.P. day . Similarly LDL value during 3rd trimester was 192.8 ± 58.72 , it touched to a peak of 220 ± 31.72 during labour , then it declined to 183 ± 29.51 on 24 hrs . P.P. and decreased to 150 ± 10 on 30th P.P. day . Differences in the values of STC & LDL during 3rd trimester labour and in the post patrum period was statistically significant with the mean values of these parameter for the group as such , however there was not much difference in the level of HDL as such . Rise in STC and LDL in pts. with still birth was 10.7% and 14.5% respectively , while it was 6% and 14.5 for the group as such . Similarly fall in the HDL was 14 % and 10 % respectively.

Effect of parity -

We studied the relation of parity with pre-eclampsia and eclampsia . pre-eclampsia was found to be more common (6 out of 10) in primiGravida . Similarly eclampsia was also found to be more common (11 out of 17) in PrimiGravida. Similar observation was made by Colvin et al (1939) who noted high percentage of cases of Toxaemia among Young primiGravida . Earlier workers also noted similar observations (Acosta - Sisson and bains , 1930 : Upshaw et al , 1932) . Colvin also concluded that Toxaemia is more concerned with age rather than parity . We also studied the differences in serum lipoproteins in relation to parity. In pt's with pre-eclampsia mean value of STC and LDL was little higher in PrimiGravidae in comparison to multi Gravidae but this was statistically not significant . There was no constant difference in the level of HDL in both group of patients.

In patients with eclampsia levels of STC and LDL was higher during third trimester and on 30th P.P. day in Primi Gravidae in

comparison to multi Gravidae . Like pt's of pre-eclampsia , there was no constant difference in the level of HDL in both groups.

In the present study most of the Toxaemic mothers belonged to low and middle socio-economic status . Similar observations was made by De alvarez and Bratvold (1961) . Most of the Toxaemic mothers were vegetarian . 70% of the pre-eclamptic and eclamptic patients were vegetarian . The dietary content of protein and fat plays a part in the production of toxæmia of pregnancy. Majority of earlier Hinselmann (1923) Groene (1923) , and Bublitz Chenko (1925) concluded that lesser intake of protein and fat attributed to the production of Toxaemia.

40% of the pts. presented with unconsciousness in eclampsia group . On observing the lipoprotein profile it was found that mean STC & mean LDL was much higher in these patient in comparison to other patients without unconsciousness and this difference in STC & LDL level was Statistically significant during pregnancy , labour and post partum period . So it can be concluded that severity of eclampsia affects lipoprotein profile directly.

One pt. of pre-eclampsia group developed renal failure but there was no significant changes in the serum lipoproteins from other pts. 4 out of 17 pts. of eclampsia group developed renal failure and two patients showed impaired liver function but there was no significant changes in serum lipoproteins from other pts. though values were little higher specially in patients with renal failure.

II Patients with Intrauterine growth retardation - (Group - C)

The observed mean STC value in this group during 2nd trimester was 168.44 ± 7.95 , it raised minimally to 171.5 ± 9.0 during 3rd trimester and touched to a peak of 176.9 ± 9.59 mg % during labour . This declined to 172.3 ± 9.2 on 24 hrs P.P. and reached to 165.83 ± 10.83 on the 30th P.P. day . Rise in STC upto labour and fall on 24 hrs P.P. , 7th P.P. day and 30th day was statistically not significant . Total rise in STC was only 4.7% while it was 16% in pts. with pre-eclampsia.

When we compared the STC level in the three groups , they were lowest in pts. with IUGR during antepartum period , labour and post partum period and this difference was statistically highly significant.

Mean LDL value was 113.53 ± 8.0 during 2nd trimester , 119 ± 8.67 at 3rd trimester and 125.4 ± 8.77 during labour . It raised only 10% from 2nd trimester to labour while in pts. with preeclampsia total rise was 24% and 14% from 3rd trimester to labour in pts . with preeclampsia.

Rise in LDL value was not statistically significant . LDL value was also lowest in pts. with IUGR and differnce in pts. with IUGR with pts. of toxæmia was statistically significant.

Observed mean HDL value was though highest in pts. with IUGR during 2nd trimester but it's level declined rapidly reaching to 31.8 ± 1.94 during labour . Total decrease in HDL was 14% in pts with IUGR while it was 8% in pts. with preeclampsia and 10.4% in pts . with eclampsia (from 3rd trimester only). The fall in HDL level in this group was statistically highly significant, but fall in HDL was highest from 2nd trimester to labour among pts. with IUGR in comparison to preeclampsia.

Mean STG and VLDL levels during 2nd trimester were 87.88 ± 4.13 and 17.52 ± 2.5 , these values raised to 97.2 ± 7.1 and 19.44 ± 2.13 during labour . These levels gradually declined to 92.7 ± 5.62 and 18.54 ± 2.2 on 1st P.P. day and 91 ± 4.27 & 18.2 ± 2.6 on the 30th P.P. day . Rise in STG and VLDL was statistically not significant . When we compared these values with values of preeclamptic and eclamptic patients , values were the lowest in pts with IUGR and these differences were statistically significant during pregnancy & labour.

The rapid fall and low levels of HDL during pregnancies complicated by IUGR may be due to the chronic placental insufficiency leading to the decreased production of Oestrogen and ultimately causing marked fall in HDLlevel.

In normal pregnancy rising maternal plasma titre of Oestrogen appears to be the principle hormonal factor responsible for enhanced endogeneous synthesis of triglycerides . It has been studied by Berzin and Vonstudintz (1957) that oestrogen causes rise in circulatory lipid levels . In cases of IUGR lower Oestrial between 32-34 weeks are valuable in predicting IUGR when screening high risk cases (Beischer et al , 1984) so lower oestrial may in turn lead to lesser rise in triglyceride levels in IUGR cases.

The serum concentration of VLDL is dependant on it's rate of secretion by liver & degradation by lipoprotein lipase and lipoprotein lipase activity was found to be significantly increased in cases of chronically deprived fetuses like in case of IUGR in order to supply free fatty acids to the fetus (Y. Biale , 1985) . In these situations of chronic fetal distress like in IUGR there is decreasd supply of glucose to fetus , so complimentary changes take place in the placenta leading to an increased supply of free fatty acids to fetus which are liberated by hydrolysis of circulating maternal triglycerides .

It is known that cholesterol is transported in the form of lipoprotein in the plasma and higher proportion of cholesterol is formed in LDL (beta lipoprotein) . Studies on cultured fibroblast lymphocytes and arterial smooth cells have shown existance of specific binding sites or LDL receptors . After binding LDL is internalized by an adsorptive endocytice process and hydrolysed by lyso somal enzymes giving rise to amino acids cholesterol and free fatty acids . It is postulated that in cases of IUGR there may be defect in receptor level of LDL , but the exact nature is not known . In our study we found slight rise in LDL level during pregnancies of Pts with IUGR , but we could not find out the exact cause for which further study is needed.

We broadly divided IUGR group into two subgoups depending on it's severity decided by USG examination of fetus and monitoring it's growth as pregnancy advanced . We stuied the difference in lipoproteins in both subgroup and found that though STC , LDL values were lower in pt's with severe IUGR in comparison to patients with mild IUGR but it was not significant statistically. HDL values were much lower in pts with severe IUGR and it was statistically significant.

For HDL	mild Vs severe	II nd trimester	p < .05
	mild Vs severe	III rd trimester	p < .001
	mild Vs severe	during labour	p < .001

SUMMARY & CONCLUSION

SUMMARY AND CONCLUSION

The present study was carried out to evaluate the changes in serum lipoproteins in high risk pregnancies (Preeclampsia, eclampsia & IUGR) during their Ante partum, Intra partum and Post partum period (upto 1 month) and also to know the changes in lipoprotein pattern in relation to parity, severity and also to know the incidence of other complications related to disease itself.

Total 37 cases were taken (10 preeclampsia, 17 eclampsia and 10 IUGR) and they were followed up during Ante partum, Intra partum and Post partum period. Lipoprotein levels (STC, STG, HDL, LDL & VLDL) were estimated during 2nd and 3rd trimester, intra partum 24 hrs., 7 day and 1 month post partum.

1. Serum lipoproteins during Ante partum period

(a) Serum Total Cholesterol (STC)

- (i) In Preeclampsia rise from 2nd trimester to 3rd trimester was statistically significant ($p < .05$) while rise from IIIrd trimester to labour was statistically not significant ($p > .05$).
- (ii) In Eclampsia rise from 3rd trimester to labour was statistically highly significant ($p < .001$).
- (iii) In cases of IUGR rise in STC from 2nd to 3rd, 3rd to labour and from 2nd trimester to labour was statistically not significant ($p > .05$)
- (iv) Values were highest in cases of eclampsia.

(b) Low density Lipoproteins (LDL)

- (i) In pts. with preeclampsia rise from 2nd trimester to labour was statistically highly significant $p < .001$ and from 3rd trimester to labour it was statistically not significant ($p > .05$)
- (ii) In pts. with eclampsia rise from 3rd trimester to labour was statistically highly significant ($p < .001$)
- (iii) In pts. with IUGR rise from 2nd trimester to 3rd trimester & from 3rd to intrapartum and from 2nd to labour was statistically not significant ($p > .05$)
- (iv) Values were highest in pts with eclampsia.

c. High Density Lipoproteins (HDL) -

- (i) In preeclamptic pts HDL values gradually declined from 2nd trimester to 3rd trimester & from 3rd to labour

IInd vs IIIrd $p > .05$

IIIrd vs I.P. $p > .05$

IInd vs I.P. p < .05

(ii) In eclamptic pts HDL gradually declined from 3rd trimester to labour
IIIrd vs I.P. p < .001

(iii) In pts with IUGR HDL declined from 2nd trimester to 3rd and from 3rd trimester to labour.

IInd vs IIIrd p < .05

IInd vs I.P. p < .001

(iv) values were lowest among pts with eclampsia while fall from 2nd trimester to labour was higher in pts with IUGR in comparison to preeclampsia.

(d) Serum triglycerides (STG) & Very low density lipoprotein (VLDL) -

(i) In pts. with preeclampsia rise in STG and VLDL from 2nd trimester to labour was significant

IInd vs I.P. p < .05

IInd vs IIIrd p > .05

IIIrd vs I.P. p > .05

(ii) In eclamptic pts . STG and VLDL raised minimally p > .05

(iii) In pts with IUGR STG and VLDL raised from IInd to IIIrd and from IIIrd to labour but it was statistically not significant

p > .05

(iv) Values were highest among pts with eclampsia

2. Serum lipoproteins during labour

(a) STC , LDL , STG and VLDL attained their peak during labour in all the three groups.

(b) HDL declined from their initial value gradually in all the three group and was lowest during labour.

(c) STC , LDL , STG and VLDL values wee highest in pts with eclampsia while HDL values were lowest in eclampsia .

3. Serum Lipoprotein during post partum period

(a) Serum Total Cholesterol (STC)

(i) In pre eclamptic pts it declined abruptly within 24 hrs and then gradually upto 1 month

IP vs 24 hrs PP p < .001

IP vs 7thday PP p < .001

It returned to its initial value on 7th PP day

(ii) In pts with eclampsia it declined abruptly with in 24 hrs and then gradually upto 1 month

IP vs 24 hrs. PP p < .001

IP vs 7 thday PP p < .001

Fall was too much on 30th d PP in comparison to its initial value on IIIrd trimester.

(iii) In pts. with IUGR it declined gradually and reached to its initial value on 7th PP day

$$\begin{array}{ll} \text{IP vs 1st PP day} & p > .05 \\ \text{IP vs 7th, 30th d PP} & p > .05 \end{array}$$

(b). Low Density Lipoprotein (LDL)

(i) in pts with pre eclampsia it fall abruptly with in 24 hrs P.P. and then gradually upto 30th d PP

$$\begin{array}{ll} \text{IP vs 24 hrs PP} & p < .05 \\ \text{IP vs 7md PP} & p < .05 \end{array}$$

It returned to it's initial value near about 7th day P.P

(ii) In Eclampsia pts. it declined maximum within 24 hrs PP then gradually upto 1 month

$$\begin{array}{ll} \text{IP vs 24 hrs. PP} & p < .001 \\ \text{IP vs 7thd PP} & p < .001 \\ \text{IP vs 30th md PP} & p < .001 \end{array}$$

It returned to it's initial value on 30th PP day

(c) High Density Lipoprotein (HDL)

(i) In pts with preeclampsia HDL raised within 24 hrs PP then upto 7thd PP but it was constant after that.

$$\begin{array}{ll} \text{IP vs 24 hrs PP} & p > .05 \\ \text{IP vs 7md PP} & p < .05 \end{array}$$

(ii) In pts with eclampsia it increased within 24 hrs. P.P. after that it decreased then again increased.

$$\begin{array}{ll} \text{IP vs 24 hrs PP} & p > .05 \\ \text{IP vs 7md PP} & p > .05 \\ \text{IP vs 30md PP} & p > .05 \end{array}$$

(iii) In pts. with IUGR , it raised gradually upto 7th PP day then declined on 30th P.P. day

$$\begin{array}{ll} \text{IP vs 24 hrs. PP} & p > .05 \\ \text{IP vs 7thd PP} & p > .05 \\ \text{IP vs 30thd PP} & p > .05 \end{array}$$

(d) Serum Triglyceride & Very Low Density Lipoprotein (STG & VLDL)

(i) In pts with pre eclampsia it fall maximum within 24 hrs then gradually upto 30thd P.P.

$$\begin{array}{ll} \text{IP vs 24 hrs.PP} & p > .05 \\ \text{IP vs 30 thd PP} & p < .05 \end{array}$$

(ii) In pts. with eclampsia it decreased maximum within 24 hrs P.P. then gradually upto 30th d . P.P'

$$\begin{array}{ll} \text{IP vs 24 hrs PP} & p > .05 \\ \text{IP vs 30th d PP} & p < .05 \end{array}$$

Serum Lipoproteins in relation to severity-

- (i) On comparing the serum lipoprotein in mild and severe pre eclampsia . Percentage increase in STC and LDL was more in pts with severe pre eclampsia , values of HDL were lower in severe Pre eclampsia
- (ii) In Eclampsia group, pts delivering still birth child showed much higher STC , LDL values than other pts in the same group and also decrease in HDL was slightly more in those pts.
- (iii) In pts with IUGR , though values of STC and LDL were lower in pts. with severe IUGR but this difference was statistically not significant . However HDL level was much less in pts with severe IUGR and this difference was significant during pregnancy and labour.

One pt. from pre eclampsia group and four pts from Eclampsia group developed renal failure , two eclamptic pts. showed abnormal LFT . But serum lipoproteins were not markedly deviated in these pts, in comparison to other pts. except pts. with renal failure in eclampsia group but changes were not significant

Serum Lipoprotein In relation to parity -

- (i) In Pre eclamptic pts mean value of STC and LDL were little higher in Primigravida but it was statistically not significant , no constant difference in level of HDL.
- (ii) In Eclamptic pts STC and LDL values were higher in Primigravida in comparison to multigravida but this was statistically not significant there was no constant difference in HDL level .
- (iii) 60% of pts were Primigravida in both groups.

Socio Economic status

40% of pre eclamptic pts , 55% of Eclamptic and 50% of IUGR pts were belonging to lower socio-economic status.

Conclusion -

At the end of our study we found that

*STC , LDL raised significantly in pts with Pre eclampsia , Eclampsia & attained maximum value during labour and decreased thereafter.

*STC , LDL raised minimally in pts with IUGR and attained their peak at labour and decreased thereafter

*HDL constantly decreased during pregnancy in all the three groups but this decrease was maximum in pts with IUGR

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MASTER CHART

PRE ECLAMPSIA GROUP "A"

Serial no	Name	Age	Gravida	S.Econo	Diet	Mode of Delivery	Out come
1	Monorma	23yr	Primi	Middle	Veg .	FTND	M Baby 2.8 Kg
2	Mamta jain	21yr	Primi	Middle	Veg	FTND	F Baby 2.6 kg
3	Parvati	20yr	Primi	Lower	Veg	FTND	F Baby 2.6 kg
4	Rupali Rai	26yr	G2 P2 L2	High	N.Veg	Elective c.s.	M Baby 2.9 kg
5	Sangeeta	22yr	Primi	High	N.Veg	FTND	M Baby 2.8 kg
6	Sangeeta Jain	26yr	G3 P2 L2	High	Veg	FTND	M Baby 2.6 kg
7	Guddi	22yr	G2 P2 L2	Lower	Veg	FTND	F Baby 2.6 kg
8	Sudha	24yr	Primi	Lower	Veg	Vaginal delivery (Premative)	F Baby 2 kg
9	Kiran	24yr	G2 P2 L2	Middle	N.veg	FTND	M Baby 2.25 kg
10	Bimla	22yr	Primi	Lower	Veg	Vaginal delivery Primitive	M Baby 2.4 kg

ECLAMPSIA GROUP "B"

Name	Age	Gravida	S.Econ.	diet	Mode of delivery	Out come
Rajni	23 Yr.	Primi	Middle	N. Veg	Premature delivery	F.baby 2.4 Kg
Guddi	26 Yr.	G3 P2 L2	Lower class	N. Veg	Vaginal delivery	Dead baby
Meena	25 Yr.	Primi	Upper Class	N. Veg	FTND	M.Baby 2.8 Kg
Hemwati	22 Yr.	Primi	Middle	Veg.	Premature delivery	
Kashi bai	25 Yr.	G1 P1 L1	Lower class	Veg.	FTND	F.Baby 2.7 Kg
Gomti	25 Yr.	G3 P3 L3	Lower class	Veg.	Vaginal delivery	F.Baby 2.5 Kg
Mala	23 Yr.	Primi	Middle	Veg.	FTND	F.Baby 2.4 Kg
Geeta	18 Yr.	Primi	Middle	Veg.	Forccep delivery	F.Baby 2.8 Kg
Raj Kumari	25 Yr.	G2 P1 L1	Middle	N. Veg	Vaginal delivery	F.Baby 2.0 Kg
Susheela	26 Yr.	G3 P3 L3	Lower class	Veg.	FTND	F.Baby 2.8 Kg
Madhu	18 Yr.	Primi	Lower class	N. Veg	Full term Vegal delivery	
Pawan Kumari	21 Yr.	Primi	Lower class	Veg.	FTND	F.Baby 2.4 Kg
Raj Kumari	26 Yr.	G2 P2 L2	Lower class	Veg.	FTND	F.Baby 2.7 Kg
Kunwar Baj	20 Yr.	Primi	Lower class	Veg.	Forcep delivery of still born (FT)	
Angoori	24 Yr.	Primi	Lower class	Veg.	Vaginal delivery	
Jareena	21 Yr.	Primi	Middle	N. Veg	FTND	F.Baby 2.6 Kg
Premwati	26 Yr.	Primi	Middle	Veg.	FTND	F.Baby 2.4 Kg

IUGR GROUP "C"

Cases no	Name	Age	Gravida	S.Ecno	Diet	Mode of del.	Out come	Height	Weight
1	Sunita	26 yrs	G5P4L3	middle	veg	CS	M. baby 1.9 kg	5'1"	48 kg
2	Sunita	24 yrs	Primi	lower	veg	premature vaginal del.	F. baby 2.10 kg	5'2"	42 kg
3	Uma Verma	22 yrs	Primi	middle	N.veg	CS	M. baby 1.8 kg	5'0"	48 kg
4	Geeta Tewari	26 yrs	G4P3L3	lower	veg	CS	M. baby 2.3 kg	5'1½"	46 kg
5	Rekha	20 yrs	Primi	lower	veg	CS	F. baby 1.8 kg	4'11"	50 kg
6	Kusum	25 yrs	G2P2L2	lower	veg	premature vaginal del.	F. baby 2.2 kg	5'2"	52 kg
7	Kaush-alia	26 yrs	G4P3L3	middle	veg	vaginal del.	M. baby 2.2 kg	5'1"	48 kg
8	Nafisa	26 yrs	G3P2L2	lower	N.veg	vaginal del.	F. baby 2.35 kg	5'0"	46 kg
9	Sushma	25 yrs	G1P1L0	middle	veg	premature vaginal del.	M. baby 2.0 kg	4'11"	48 kg
10	Pista	22 yrs	G3P2L2	lower	veg	CS	M. baby 1.8 kg	5'0"	50 kg

PRE ECLAMPSIA GROUP "A"
STC

Name	II trimester	III trimester	IP Period	24 hrs PP	7th day PP	30th day PP
Manorama	-	171	180	160	156	-
Mamta Jain	160	168	184	160	150	140
Parvati	-	210	210	200	190	-
Rupali Rai	180	-	208	180	170	-
Sangeeta	-	256	270	240	230	210
Sangeeta Jain	170	186	200	190	-	-
Guddi	-	184	190	160	156	150
Sudha	166	176	190	164	156	-
Kiran	-	180	190	168	160	-
Bimla	214	230	236	210	200	190

STG

Name	II trimester	III trimester	IP Period	24 hrs PP	7th day PP	30th day PP
Manorama	112	114	105	102	-	-
Mamta Jain	76	80	84	81	76	70
Parvati	-	110	120	100	96	-
Rupali Rai	90	-	84	80	-	-
Sangeeta	-	144	150	134	130	110
Sangeeta Jain	110	116	120	-	-	-
Guddi	-	86	90	80	72	70
Sudha	90	96	90	82	-	-
Kiran	-	88	85	78	-	-
Bimla	116	128	128	120	112	108

PRE ECLAMPSIA GROUP "A"
HDL

Name	II trimester	III trimester	IP Period	24 hrs PP	7th day PP	30th day PP
Manorama	-	37	34	36	36	-
Mamta Jain	30	28	26	30	32	30
Parvati	-	40	38	38	36	-
Rupali Rai	36	-	32	38	34	-
Sangeeta	-	42	40	44	40	37
Sangeeta Jain	34	33	31	30	-	-
Guddi	-	33	31	33	36	34
Sudha	32	28	28	32	34	-
Kiran	-	34	34	36	34	-
Bimla	42	38	36	38	40	37

LDL

Name	II trimester	III trimester	IP Period	24 hrs PP	7th day PP	30th day PP
Manorama	-	114.6	123.2	103	99.6	-
Mamta Jain	114.8	124	139.2	113.8	102	96
Parvati	-	148	168	146	134.8	-
Rupali Rai	126	-	156	127.2	120	-
Sangeeta	183.2	200	165.2	165.2	165.2	146
Sangeeta Jain	114	132.8	143.2	136	-	-
Guddi	-	131.8	141	111	104.6	96
Sudha	116	128.8	140	114	105.6	-
Kiran	-	128.4	136.8	115	110.4	-
Bimla	148.8	169	172.4	148	137.6	126.4

ECLAMPSIA GROUP "B"
STC

Name of pts	II trimester	III trimester	IP period	24 hrs PP	7th Day PP	30th Day PP
Rajani	-	222	230	210	200	-
Guddi	-	210	270	230	220	-
Meena	-	170	190	180	-	-
Hemwati	-	278	300	290	270	-
Kashi bai	-	250	266	221	230	-
Gomti	-	192	200	-	180	170
Mala	-	-	187	170	165	160
Geeta	-	200	210	170	160	-
Raj Kumari	-	176	190	170	160	155
Susheela	-	192	202	190	186	-
Madhu	-	314	334	246	230	210
Pawan Kumari	-	210	230	214	200	-
Raj Kumari	-	215	230	215	205	-
Kunwar bai	-	228	240	198	186	-
Angoori	-	229	246	220	204	200
Jareena	-	214	230	210	200	-
Premwati	-	222	230	210	200	190

STG

Name of pts	II trimester	III trimester	IP period	24 hrs PP	7th Day PP	30th Day PP
Rajani	-	110	120	106	90	-
Guddi	-	130	150	110	110	-
Meena	-	90	88	80	-	-
Hemwati	-	150	160	150	140	-
Kashi bai	-	125	130	116	110	-
Gomti	-	91	84	-	80	78
Mala	-	-	70	65	60	60
Geeta	-	100	101	90	86	-
Raj Kumari	-	86	90	80	76	155
Susheela	-	109	110	100	92	-
Madhu	-	160	170	192	130	110
Pawan Kumari	-	100	110	105	100	-
Raj Kumari	-	101	110	101	96	-
Kunwar bai	-	111	120	94	90	-
Angoori	-	106	112	100	98	98
Jareena	-	100	104	100	96	-
Premwati	-	116	120	115	112	105

ECLAMPSIA GROUP "B"
HDL

Name of pts	II trimester	III trimester	IP period	24 hrs PP	7th Day PP	30th Day PP
Rajani	-	32	26	30	32	-
Guddi	-	27	22	24	22	-
Meena	-	27	24	27	-	-
Hemwati	-	37	32	32	28	-
Kashi bai	-	37	33	35	32	-
Gomti	-	36	32	-	34	32
Mala	-	-	24	22	22	22
Geeta	-	32	26	30	36	-
Raj Kumari	-	28	22	30	32	30
Susheela	-	37	32	34	32	-
Madhu	-	38	34	32	34	32
Pawan Kumari	-	34	32	32	30	-
Raj Kumari	-	34	30	34	30	-
Kunwar bai	-	32	28	32	34	-
Angoori	-	34	28	28	32	30
Jareena	-	33	30	32	30	-
Premwati	-	32	26	32	32	32

LDL

Name of pts	II trimester	III trimester	IP period	24 hrs PP	7th Day PP	30th Day PP
Rajani	-	168	178	159.8	150	-
Guddi	-	157	218	184	176	-
Meena	-	125	148.4	137	-	-
Hemwati	-	211	236	228	210	-
Kashi bai	-	188	203	162.8	176	-
Gomti	-	150.8	151.2	-	130	122.4
Mala	-	-	149	133	124	126
Geeta	-	148	161.2	122	107.8	-
Raj Kumari	-	131.8	150	124	110.8	109
Susheela	-	138.2	148	136	131.6	-
Madhu	-	244	266	185.5	166	152
Pawan Kumari	-	158	176	159	150	-
Raj Kumari	-	160.2	178	160.2	155.8	-
Kunwar bai	-	173.2	15	147.2	134	-
Angoori	-	173.8	195.6	170	152.4	148
Jareena	-	161	179	158	150.8	-
Premwati	-	164.8	178	153	142.6	129

IUGR GROUP "C"
STC

Name	II trimester	III trimester	IP Period	24hrs PP	7th day PP	30th day PP
Sunita	167	168.4	174	172	170	175
Sunita	179	184	190	182	180	-
Uma Verma	170	172	175	172	170	172
Geeta Tewari	-	162	168	160	156	150
Rekha	174	177	181	178.2	175	180
Kusum	168	174	179	162	156	-
Kaushailya	178	185	192	190	183	180
Nafisa	158	163	170	162	156	-
Sushma	166	172	179	176	170	-
Pista	156	158	161	159	156	150

STG

Name	II trimester	III trimester	IP Period	24hrs PP	7th day PP	30th day PP
Sunita	85	92	98	95	95	96
Sunita	86	90	92	90	86	-
Uma Verma	88	96	100	94	92	90
Geeta Tewari	-	84	90	86	83	80
Rekha	90	97	102	96	92	90
Kusum	90	96	100	94	92	-
Kaushailya	98	104	110	106	102	100
Nafisa	82	88	92	90	89	-
Sushma	80	86	90	82	80	-
Pista	92	97	98	94	92	90